McElhanney

APPENDIX A

SUMMARY OF RECENT REPORTS

MCSL File No. 2211 46790-0
CSRD Sanitary Sewer Study
January 17th, 2008

SUMMARIES OF PAST STUDIES:

1. **Associated Engineering Report - 1979**

Three Overall objectives:

A. Sewage to be kept out of Baynes Sound.
B. Protect fish and beaches.
C. Ensure system is economically feasible.

- Two concepts, 'core area' and the 'Comox Valley area' (inclusive of outlying areas).
    - Option 1 = costs for outlying areas later on = very high.
    - Option 2, outlying areas pay upfront capital costs for components enlarged to suit, but no O&M costs until these areas actually connect to the system.
- Outfall is 2.5 km long and end is in 60 metres of water.
- 25 year debt repayment was considered. = +/-$68 per household/year as a cost of servicing the debt, assuming government grants were applied, else $88 per household.
- Covered the following scope:
    - Service area boundaries.
    - Population growth and rates of growth.
    - Water quality objectives.
    - Sewer design criteria, per capita loading and flow rates.
    - Surveys and prepare concept routing.
    - Confirmed outfall characteristics.
    - Cost estimates.
    - Grant application opportunities.
- Pump station and treatment facilities (mechanical facilities) were designed to a 25 year life. Gravity trunks, force-mains and outfall were designed to a 50 year horizon.
- Population growth rates and total projected populations are provided.

495 Sixth St
Courtenay BC
Canada V9N 6V4
Tel 250 338 5495
Fax 250 338 7700
www.mcelhanney.com/mcsl

- Assumed 275 l/day/cap and 7,300 l/ha/day (.085 l/s/ha) for I&I and the Babbitt peaking factor.
- Total flows expected are as indicated on page 29.
- Treatment plant site selection criteria on page 58.
- Outlying areas not yet investigated in much detail.
- Alternate to the Courtenay pumping station was a gravity trunk to Jane Street, but trunk would have been 8 metres deep by this point in Comox. Would still have needed to pump from there around the foreshore.
- Three parallel pipes comprise the Courtenay River siphon.
- Expectation is that the Courtenay pump station should be upgradeable to 50 year horizon from 25 year design, either via wet well capacity increase and additional pumps or via larger pumps. – need to discuss.
- Jane Street station is expected to be replaced at the 25 year mark. (This appears to have been a reasonably close prediction).
- CFB Comox station was to have been configured to allow for larger pumps if and when needed. – agreed.
- Costs to Courtenay and Comox were derived based on 50% of total cost paid on a ratio of population in the two communities and 50% of the cost paid on the ratio of property assessments in the two communities. Under supplementary letters patent.

2. CH2MHill – Willemar Bluffs Pressure Sewer Relocation Study – Oct. 2005

- Concept study for Willemar Bluffs pressure sewer component replacement.
- Four alternate routes examined. One route decided favorable. Some variation at the downstream end.
- Suggests Courtenay pumping station is good for another 10 years +/-.
- Uses 355 l/cap/day as dry weather flow. (High)?
- Uses measured peak I&I as the long term I&I design values, assuming these will remain relatively static.
- Suggests Jane Street Station needs replacement.

3. **EarthTech – CVWPCC Long Range Planning Report – Oct. 2005**

- Derived sequential treatment system upgrading recommendations, by year.

4. **Koers – Greenwood and Hudson Road Trunk Sewer Review – July 2006**

- Revisited the two trunk routes originally derived by MCSL in 1997.
- Recommended agreement on counting 'equivalent development units' in Courtenay and Comox as a means of cost calculation year on year, as compared to more flume/chart recorders.
- Block 71 and DL185, Seal Bay and Little River areas were considered.
- CFB Pump Station upgrade expected in +/- 15 years.
- CFB Trunk considered slightly undersized, in the long term full build out condition, potentially.
- Recommended another DCC bylaw amendment to up the rates collected.

5. **MCSL Sandwick, Meadowbrook and Huband Local Area Studies – 2004-2006**

- Investigated routing of sewers in outlying areas, potentially to be annexed by City of Courtenay.
- Population calculations, likely land uses, densities, per capita flow derivations, etc.
- Options for short term pumping.
- Cost estimates and cost recovery discussions.

6. **Impact of Connection of Cumberland and Royston to the CSRD Regional Collection System and Wastewater Treatment Plant, 1992**

- Evaluated the potential impacts, primarily at the treatment level, to the CVRD sewerage system.
- 2 potential force main routes were discussed; Royston Rd to Courtenay pump station via the E&N rail ROW, and a direct connection to the CVRD force main through Comox Bay.

- Per capita flow rates and I&I estimates vary significantly from know values, thus total flow rates and therefore hydraulic analysis are no longer valid.

7. **City of Courtenay Sanitary Sewer Study, 1995**

- Study developed a hydraulic model of the City's sewerage system utilizing Sansys software. Model calibration was completed by way of in stream flow monitoring.

- Established I&I rate in west Courtenay at 0.19l/s/ha, Anderton/First Ave and East Courtenay at 0.11 l/s/ha, and Island Hwy North at 0.25l/s/ha. Report noted that the duration of flow monitoring was limited, thus rates could be higher than data indicated. Aggressive I&I reduction was recommended in known areas of susceptibility.

- Recommended multiple bypass options to extend the service life of trunk sewers at or near capacity (minimal impact on this study)

- Investigated the possibility of constructing a collection system for South Courtenay (areas recently annexed)

8. **Saratoga/Miracle Beach Sewage Collection System Study, 2005**

- Investigated collection system options in the Saratoga/Miracle Beach area, including gravity, STEP and grinder pump.

- At the time of the report, a treatment plant location/disposal option had not been selected. Report cites 3 potential locations.

- LWMP area was not coincidental with LAP area. Zone 3, the comprised primarily of large rural lots was not included in the service area.

- Service area populations were estimated to be 4460 by 2020, based on the LAP growth projection of 2% per annum.

- Study produced construction cost estimates for the 3 options noted above, gravity option is the most expensive, STEP has lowest cost. O&M costs are estimated to be similar for all 3 options.

9. **Royston/ Union Bay Sewage Collection, Treatment and Discharge Study, 2005**

- LWMP planning study that investigated the 3 collection options (Gravity, STEP, and grinder pump) for the RID/UBID lands along the waterfront

- Identified 2 possible locations for a treatment facility, inland of Gartley Point, and at Washer Creek.

- Investigated the opportunity to utilize ocean discharge into Bayne Sound (option A), or the north east side of Denman Island (option B). Both of these options are expected to meet with significant resistance from residents. Option C explored the possibility of connecting directly to the CVRD force main in Comox. Also investigated was the possibility of ground discharge (not feasible due to poor soils and lack of available land), and discharge into several watercourses.

- Report recommended a membrane bioreactor and gravity collection, with discharge into Argyle or Washer Creek.

- *** CVRD have informed MCSL that discharge into Washer Creek has been removed as a disposal option, based on the MOE requirements to do so. Komex to complete an EIS as part of the CVRD's pre registration under the MSR

- Cost estimates were completed for each option.

10. Comox Valley Sewerage Commission – System Condition Overview, 2001

- Study was commissioned by the CVSC in order to assess the overall condition of the trunk sewage facilities, prior to the CVSC potentially taking over this infrastructure.
- DCC schedules were generated

NOTE:
NO EXISTING SANITARY SYSTEMS SHOWN, OTHER THAN REGIONAL DISTRICT COMPONENTS.

LEGEND
- CORE STUDY AREA BOUNDARY
- EXISTING REGIONAL DISTRICT SANITARY FORCEMAIN
- EXISTING REGIONAL DISTRICT TRUNK GRAVITY MAIN
- PROPOSED TRUNK SANITARY MAIN
- PROPOSED GRAVITY COLLECTION SYSTEM
- EXISTING CVRD PUMP STATION
- PROPOSED PUMP STATION AS NOTED IN PAST STUDIES
- PROPOSED POSSIBLE LOCATION OF SANITARY TREATMENT PLANT (PER PAST STUDY)

STRAIT OF GEORGIA

KYE BAY PUMP STATION

CORE AREA BOUNDARY

CFB PUMP STATION

OUTFALL

BATES BEACH/ KITTY COLEMAN AREA (NO STUDIES TO DATE)

SARATOGA/MIRACLE BEACH SEWAGE COLLECTION SYSTEM, 2005

AREA B

COLBY RD. PUMP STATION

CVWPCC

TOWN OF COMOX

POSSIBLE NEW OCEAN OUTFALL

GOOSE SPIT PUMP STATION

JANE ST. PUMP STATION

INDIAN RESERVE PUMP STATION

ROYSTON/UNION BAY SEWAGE COLLECTION SYSTEM, 2005

OPTION B: PRESSURE SEWER SUBMARINE CROSSING.

COURTENAY PUMP STATION

PROPOSED LOCAL GRAVITY COLLECTION AREAS (TYP.)

HWY 19A

AREA C

CITY OF COURTENAY

POSSIBLE ROYSTON TREATMENT PLANT

OPTION A: PRESSURE/GRAVITY SEWERS TO EXISTING COURTENAY RIVER SIPHON.

AREA A

CONNECTION OF CUMBERLAND & ROYSTON TO THE CSRD REGIONAL COLLECTION SYSTEM, 1992

TO NANAIMO

HWY 19

TO CAMPBELL RIVER

HWY 19

VILLAGE OF CUMBERLAND

NOTE:
ROYSTON/UBID/SARATOGA/MIRACLE BEACH AREAS:
-VARIOUS COLOURS REPRESENT DIFFERING GRAVITY CATCHMENTS.
-COLLECTION SYSTEMS NOT SHOWN.

Filename: K:\ENG\49970\final emp\49970-Report1.dwg(S-6A

Plotted: May 13, 2011 - 14:03:36

No.	Date	Revision	Dr.	Chk'd

McElhanney
McElhanney Consulting Services Ltd.
495 SIXTH STREET
COURTENAY, B.C. V9N 6V4
PH (250) 338-5496
FAX (250) 338-7700

Designed: N/A	Checked: IW/BH	Date: 01/OCT/2008
Drawn: TM	Surveyed: N/A	

SCALE 1 : 50,000 (APPROX.)

Approved Sealed

COMOX VALLEY REGIONAL DISTRICT

PAST STUDY OUTCOME OUTLYING AREAS

CVRD MASTER SEWERAGE STUDY

COMOX VALLEY, BC

Client Drawing No

MCSL Project No. 2211-46970-0

Drawing No. S-6A

Sheet 6 of 13 Revision 2

Destroy all prints bearing previous number

NOTE:
NO EXISTING SANITARY SYSTEMS SHOWN,
OTHER THAN REGIONAL DISTRICT COMPONENTS.

LEGEND

- CORE STUDY AREA BOUNDARY
- EXISTING REGIONAL DISTRICT SANITARY FORCEMAIN
- EXISTING REGIONAL DISTRICT TRUNK GRAVITY MAIN
- PROPOSED TRUNK SANITARY MAIN
- PROPOSED GRAVITY COLLECTION SYSTEM
- EXISTING CVRD PUMP STATION
- PROPOSED PUMP STATION AS NOTED IN PAST STUDIES

STRAIT OF GEORGIA

KYE BAY PUMP STATION

CORE AREA BOUNDARY

OUTFALL

COMOX VALLEY SEWERAGE COMMISSION, 1997/2001

CFB COMOX TRUNK

CFB PUMP STATION

GREENWOOD (NORTH) TRUNK

GREENWOOD & HUDSON ROAD TRUNK SEWER, JULY 2006

COLBY RD. PUMP STATION

CVWPCC

HUDSON (SOUTH) TRUNK

PRESSURE SEWER RELOCATION, OCT 2005

TOWN OF COMOX

SANDWICK, MEADOWBROOK & HUBAND LOCAL AREA STUDIES, 2004-2006

HWY 19A

JANE ST. PUMP STATION

INDIAN RESERVE PUMP STATION

GOOSE SPIT PUMP STATION

COURTENAY PUMP STATION

SANDWICK TRUNK SEWER

CITY OF COURTENAY

HWY 19A

WEST COURTENAY TRUNK

ONGOING STUDY
2011 - SOUTH COURTENAY LAP

SOUTH ARDEN TRUNK

CITY OF COURTENAY SANITARY SEWER STUDY, 1995

TO CAMPBELL RIVER

TO NANAIMO

HWY 19

HWY 19

VILLAGE OF CUMBERLAND

INFORMATION ON EXISTING UTILITIES MAY NOT BE COMPLETE OR ACCURATE. PRIOR TO CONSTRUCTION CONTRACTOR SHALL EXPOSE LOCATIONS OF ALL EXISTING UTILITIES AND ADVISE THE ENGINEER OF POTENTIAL CONFLICTS.

THIS DRAWING HAS BEEN PREPARED FOR THE CLIENT IDENTIFIED, TO MEET THE STANDARDS AND REQUIREMENTS OF THE APPLICABLE PUBLIC AGENCIES. McELHANNEY CONSULTING SERVICES LTD., ITS EMPLOYEES, SUBCONSULTANTS AND AGENTS ACCEPT NO RESPONSIBILITY TO ANY OTHER PARTY, INCLUDING CONTRACTORS, SUPPLIERS, CONSULTANTS AND STAKEHOLDERS, OR THEIR EMPLOYEES OR AGENTS, FOR LOSS OR LIABILITY INCURRED AS A RESULT OF THEIR USE OF THESE DRAWINGS.

Filename: K:\ENG\46970\final engr\46970 Report drwg S-6B

Plotted: May 19, 2011 - 14:40:48

No.	Date	Revision	Dr.	Chk'd

McElhanney
McElhanney Consulting Services Ltd.
495 SIXTH STREET
COURTENAY, B.C. V9N 6V4
PH (250) 338-5496
FAX (250) 338-7700

Designed: N/A	Checked: IW/BH	Date: 01/OCT/2008
Drawn: TM	Surveyed: N/A	

SCALE 1 : 30,000 (APPROX.)

Approved Sealed

COMOX VALLEY REGIONAL DISTRICT

PAST STUDY OUTCOME
CORE AREA
CVRD MASTER SEWERAGE STUDY
COMOX VALLEY, BC

Client Drawing No.

MCSL Project No. 2211-46970-0

Drawing No. S-6B

Sheet 7 of 13

Revision 2

Destroy all prints bearing previous number

McElhanney

APPENDIX B

MISCELLANEOUS PROJECT MEETING MINUTES TO DATE

McElhanney

MEETING MINUTES

Project Name:	**COMOX VALLEY SEWERAGE MASTER PLAN UPDATE PROJECT**		
Location:	**CSRD OFFICES**		
MCSL Project Number:	2211-46970-0	Date: January 17, 2008	Time: 10.10 a.m.
Attendees:	Ron Neufeld, P.Eng, CSRD, rneufeld@rdcs.bc.ca Graeme Faris, CSRD, gfaris@rdcs.bc.ca Ian Whitehead, P.Eng., MCSL, iwhitehead@mcelhanney.com Bob Hudson, EIT, MCSL, bhudson@mcelhanney.com Jonathan Knudsen, Dayton & Knight, jknudsen@dayton-knight.com Al Gibb, P.Eng., Dayton & Knight, agibb@dayton-knight.com John Boyle, P.Eng., Dayton & Knight, jboyle@dayton-knight.com Kevin Lagan, P.Eng., City of Courtenay, klagan@courtenay.ca Glenn Westendorp, AScT, Town of Comox, gwestendorp@comox.ca (G. Westendorp joined meeting at +/- 11.30 a.m.)		
Distribution:	All attendees.		

	ITEMS DISCUSSED	Action By	Due Date
A.	**General introduction by MCSL.** Noted intent to solicit client feedback as to focus and issues of importance to the client group. MCSL to cover, generally, conveyance network. D&K to cover pump stations and treatment systems.		
B.	**Discussion regarding past studies/outcome.** Brief synopsis handout provided by MCSL.		
1.	New additional flumes vs. unit count and periodic calibrating measurement for Greenwood trunk, etc? Incentive to deal with I&I, if costs by volume? Kevin would prefer O&M costs pertaining to direct measurements if reasonable to do so.		
2.	8-10% (variation between sum of pump stations and flow into/out of treatment plant.) (Flow at plant is increased then sum of flows) peak flows the problem gets worse. Curve in line leading to the flue, not ideal laminar flow. Jane Street station cannot test mag meter.		
3.	20 minutes storage of Courtenay pump station during normal flows then backing up into the interceptor. Genset failure = trouble. (Where would breakout occur?) Where would sewage first surface if the Courtenay		

495 Sixth Street
Courtenay, BC, V9N 6V4
Ph: 250-338-5495
Fax: 250-338-7700

	ITEMS DISCUSSED	Action By	Due Date
	station were to fail? On a road? In a service connection? Could add another pump?		
4.	15 years cited by CH2MHill as remaining life in the Courtenay pumping station. (Pumps upgraded to variable speed, 10-12 years ago, at Courtenay station.)		
5.	Siphon under the river. Need to look at this. (Two pipes under the river? Or three?) Provision for a third pipe in future?		
6.	Trunk leading to siphon: Line storage along the logging r/w is diminished, Jim noted, due to loading increased within the catchment.		
7.	Jane Street (Comox). Two pumps kick in during storm events? Yes – very close to capacity now. *Jane Street can fault the Courtenay station by back pressure if Courtenay pumps are not ramped up and running at full speed. No SCADA now. * Occurs during dry weather. * Would also affect the Indian Band pump station.		
8.	Jane Street? Could we go to variable speed pumps? And then future SCADA would be more effective?		
9.	Can we look at Jane Street replacement instead of a new station on Doclittle? Not much room for expansion at Jane Street location. Rationale for new additional station: McDonald Wood station would potentially take 30% of Comox and relieve Jane Street, and also allow reduction in pressure on upstream portion of the existing pressure line and potentially extend its life.		
C.	**Scope of New Study:**		
1.	How much future gravity trunk alignment routing to consider within each of the member municipalities? And where to cut off. Agreed to derive point source loads only, from within Courtenay down to the siphon at the river. Not plan/profiles up into west Courtenay (but if these were produced at a concept level, they would be welcomed). Same applies for Comox. RD "plant" to be limited to joint service areas. Seal Bay pump and pressure sewer could be a joint facility.		
2.	RD bills 100% to Town for Jane Street and Colby Road, and O&M only for Kye Bay. No dispute about what is already in the ground.		
3.	Regional Planning Strategy introduced by Ron Neufeld.		
i.	Regional Sewage Planning Strategy. 50 year horizon = Blue Green map, or Sage Hills and Cumberland and Union Bay, etc. Ron will consider political will to increase the scope of the current study to better reflect the recent provincial government directive.		

MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
ii.	Union Bay to Tsolum Road, 1979 study, originally. 65,000 = original design population. As compared to CH2MHill (120 to 140K population) 50 years +/- water study regionally.		
iii.	Agreed mandate study area of present assignment = "blue/green map" and +/- 50 years.		
iv.	Kevin – 8 month study and then redundant? Better to get politicians involved now. Appetite to take on a larger sewerage mandate is there, provincially, now. Proposal for a larger scale study? • Growth) • Water) Regional boundary should be the same. • Sewer)		
v.	Union Bay and Cumberland? RFP/Terms of Reference and revised scope of work and fee. Ron will lead the process. MCSL noted we really have +/- two months to decide on an expanded scope without losing any efficiency.		
vi.	Clarification sought: • Treatment plant 50 years? 25 years for plant sizing typically and therefore second 25 years is guess work.		
vii.	Royston/UBID referendum. Bylaw will not die, but provincial government has effectively indicated no funding is available. Answer was to have been forthcoming in early December. There was a contingency budget, but costs have escalated since two years ago. Area "D" still possible for RD initiative and grants.		
D.	**I&I and Flow Criteria:**		
1.	I&I decreased in Courtenay over past few years. How to measure cost benefit. Recalibration is the reason for year 2000 or 2002 blip in the data.		
2.	Data and graphics – Kevin has, that clearly indicate I&I trend is down in Courtenay.		
3.	The RD's MSR application. I&I plan to be in place from the member municipalities.		
4.	Kevin believes City is saving money with 8 – 10 year pay back on I&I reduction, direct costs to date.		
5.	Jim: Percentage of contributory flows not changing. City is 67% summer and 50% winter. Therefore City's overall I&I rate is lower than that of Comox.		
6.	I&I cost/benefit framework for methodology to be provided by D&K. Need to look at cost of upsizing pipes and cost of treatment and disposal of		

	ITEMS DISCUSSED	Action By	Due Date
	sewage as compared to N.P.V. of I&I reduction measures.		
7.	Investigate sensitivity to three parameters and cost effectiveness of variations in those three (flow per capita, I&I, land use and population growth). Three design flow "regimes" will be developed, with "most profitable" likely forming the basis of sequential upgrade timing predictions and cost estimates.		
8.	Glenn: Town I&I: • Smoke testing and some lining of sewers. Much of Comox is short lengths of concrete pipe. • Comprehensive review of I&I thought necessary and therefore study done. • Leron chambers and vary dia. of sanitary and storm services.		
9.	• 250 vs 350 l/cap/day. Larger value includes base flow infiltration. • D&K typically uses 350 including base flow infiltration. MCSL has typically broken base infiltration out. • Water conservation measures – cost effectiveness and effect on sanitary flows? • Town has recent in-stream monitoring data. City data is 10 years old.		
10.	I&I will increase over time. Ron gave a copy of a paper to Mark DeGagne. Ian to acquire.	**RD / MCSL**	
11.	People will manipulate the system over time, leading to I&I increase.		
E.	**Land use and Population Projections.**		
1.	Population: • Secondary suites - perhaps 1/3 to 40% of homes so zoned will ultimately contain suites? • Housing costs and future demographics? • Redevelopment potential and building height increases (8 storeys now). Future?		
2.	Onsite sewage systems – speak to this. Mandate minimum frequency of pump outs.		
3.	Growth and population projections, meeting forthcoming. Include RD planners and Town/City planners.		
4.	Regional growth strategy. Sewer strategy: make sure populations and areas are the same as water plan and regional growth strategy plan (be in sync). Regional growth plan to be in advance of sanitary and water plans? I.e. Land use planning and OCPs etc. to precede.		
5.	City feels that census data is 500 low for Courtenay at present.		

	ITEMS DISCUSSED	Action By	Due Date
	22,500 at June, 2006. City is projecting 4% next 10 years; 3% after that. 13,200 as at June 2006, in Comox, and projecting 3% per year.		
6.	Land use: 20 year plan Town and City did will be provided and numbered growth areas identified, complete with build out population. ALR = likely to be protected over time.		
7.	Projections thus far suggest 39 to 43K total population at 20 years out for Courtenay alone. Best guesses on definitive numbers will be provided by City, Town, and RD.	**City/ Town / RD**	
8.	Within Courtenay policy: 1ha. or greater no sewer connection is mandatory. Need to speak to means of maintaining small systems over time in the outlying areas.		
9.	MMCD; City; Town; RD. Variations? Design criteria. Tabulate and compare.		
F.	**Route options:**		
1.	2012 or 2019? Need for Greenwood and Hudson trunks. RD to check.	**RD**	
2.	DCCs and grant funding. 5% assist assumed thus far to come from higher level government. Developer funding assistance? Year of need appears thus far will coincide with year of funding available? Graeme needs to check.	**RD**	
3.	Town/Glenn: Knight Road pipe to be constructed soon. Regional funding to be set aside and/or assigned toward this?		
4.	Climate change? Build on the beach again? Stay away from the beach?		
5.	Line the hyprescon pipe to extend its life?		
6.	Look at other routes?? Twin pipeline (elsewhere) for redundancy?		
7.	Associated Engineering only looked at cheapest route along the foreshore (initial system layout).		
8.	Redundancy in the system and emergency response? What if river crossing or beach front pipes were to fail?		
9.	Route selection matrices. Will want input from the client group in the determination of factors/intangibles, non quantifiable terms – gravity reference.		
G.	**Willemar Bluffs**		
1.	Replacement is needed soon.		

MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
	Willemar Bluffs route study. No decision yet made, pending outcome of this present study.		
2.	Comox would deflect 1200 units away from Jane Street, if Doclittle (McDonald Wood) station were built.		
3.	Note: we should not consider increase in system pressure in the existing force main.		
4.	1.5 km still no gabions. $5,000 per metre for gabions. RD surveys the line each year. ½ metre of cover only in some locations.		
5.	Courtenay pump station: Out of the station steel pipe three sections replaced due to corrosion. Short section of steel pipe only to edge of the road.		
6.	Hyprescon life time? How much of this pipe is out there? GVRD. Evaluation of pipe in the RD? Investigate.		
7.	Cathodic protection discontinuity. Fixed by RD.		
8.	Future replacement of section from Courtenay station to the proposed diversion on Doclittle? Parallel to the existing pipe. 10m r/w exists. Same alignment? Consider using HDPE pipe. Stay off the beach? Consider climate change.		
H.	**Treatment discussions:**		
1.	UBID type membrane plant? Only for small catchments.		
2.	Ongoing battles will occur relative to the existing plant site.		
3.	New owners in the area can be more problematic than are existing residents. How can we improve the interface at the existing plant with neighbours' expectations?		
4.	Through zoning – in upcoming growth plans – make people realize that the plant will stay over the long term.		
5.	Enough room at the plant for what population? Could double the footprint and could move to more space efficient technology.		
6.	Need to look at other sites, to assist in staving off Brent Road plant neighbours concerns (if it is ultimately decided to be the only viable site). City/Town/RD to suggest sites.		
7.	Potential outfall sites. Graeme to provide, stemming from UBID work (Gartley Point to Lambert Channel).		
8.	Options for new plant:		

MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
	a. Little River: If no economic sense, then don't bother to look at: Social resistance Political issues Environmental issues. b. West Courtenay: Look at Royston and Gartley Point. Baynes Sound outfall would be limited to 5000 people +/-. Else pressure sewer outfall further to Lambert channel. Deliverable will be "big circle" – not specific.		
I.	**Nocturnal Pumping:**		
1.	Nocturnal pumping? Maintenance issues? What if out of "sequence" when pumping is needed? Two differing objectives for nocturnal flows – D&K idea interceptor sewer intentionally surcharged to flatten the diurnal curves, entering the treatment plant vs. Koers idea, allowing development to occur upstream of existing trunks which do not have capacity.		
2.	Introducing risk into the system with nocturnal pumping?		
3.	Dayton & Knight Salmon Arm and Chilliwack solution examples for new system design. But retrofit will be expensive. Needs to be on larger interceptors, in order to be effective. Plant function improved with less cyclic flow variation and inlet works capacity can be extended. Deferral of expansion requirements at the plant would typically result. Intentionally surcharged large trunk sewers preferred over pumping from new tank(s).		
J.	**Communication**		
1.	Ron and Ian to be formal contact points.		
2.	Sewer advisory committee will respond to requests for action. But if query is unique to City or Town, then straight to them and copy all on same.		
3.	Planning meeting – Peter Crawford, Marvin Kamenz, Tom Knight, operation & planning liaison group need to meet ASAP.		
4.	4th March/08 next formal meeting. Same place and time. Ron to confirm.	**RD**	
5.	Southern Royston & UBID plans. Liquid waste plan studies. Graeme will provide.	**RD**	
6.	Need info from RD, per the RFP. Drawings (key plans only provided) and Jim will provide others as required.	**RD**	

MEETING MINUTES

Meeting adjourned at 2.30 p.m.

These Minutes are considered to be a true and accurate recording of all items discussed. If there are any errors or omissions they shall be brought to the attention of the writer within 10 working days; otherwise, these Minutes shall be deemed correct by all present.

Ian S. Whitehead, P. Eng., Regional Manager

McElhanney

MEETING MINUTES

Project Name:	**COURTENAY/COMOX/CUMBERLAND/CVRD LONG RANGE INFRASTRUCTURE PLANNING**		
Location:	**COURTENAY CITY HALL**		
MCSL Project Number:	2211-46970-0	Date: February 12, 2008	Time: 1:30 p.m.
Attendees:	Marvin Kamenz, Town of Comox Glenn Westendorp, Town of Comox Thomas Knight, CVRD Ron Neufeld, CVRD Mark DeGagne, MCSL Bob Hudson, MCSL Kevin Lagan, City of Courtenay Peter Crawford, City of Courtenay Nancy Henderson, City of Courtenay		
Distribution:	All attendees plus Ian Whitehead, MCSL Anya Nurvo, Village of Cumberland		

	ITEMS DISCUSSED	Action By	Due Date
1.	Expanded scope – Will likely not be confirmed until March. MCSL to continue with originally agreed scope (existing blue/green map) until this time.		
2.	Agreed that a 50 year timeline is appropriate for the study. Agreed by all parties that beyond 10 yr horizon population projections become uncertain, but providing upper and lower bounds, as well as the most probable population will be sufficient for long term planning.		
3.	Ron notes the need for updating long term studies every +/-5 years to keep current and reflect actual development conditions & trends.		
4.	Population projections for the City of Courtenay presented – land use data and population projections contained therein have been based on densification of existing urban areas where foreseeable, existing zoning where likely to remain, and probable zonings in areas likely to be densified.		
5.	Per Nancy - Shouldn't infrastructure limits be set and used to establish growth management, as in Whistler & elsewhere? Ron noted that regional growth strategy, water & sewer master plans are being completed relatively concurrently, the Valley is not bound by same		

495 Sixth Street
Courtenay, BC, V9N 6V4
Ph: 250-338-5495
Fax: 250-338-7700

www.mcelhanney.com

McElhanney

MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
	infrastructure issues as whistler.		
6.	Regional water supply may constrain growth in the Valley, sewage treatment will not.		
7.	Marvin notes the need for planning to be iterative, i.e. population growth is dictated in part by servicing costs, servicing costs driven by population to be serviced, etc. Also noted the need for infrastructure sizing to be optimized, else costs of construction, maintenance etc never fully recovered.		
8.	Bob noted that sensitivity analysis based on population projections, per capita demands over time, and I&I contribution to system will provide a range of design parameters. As actual growth is realized, upper and lower bounds of projected flows will converge.		
9.	Marvin notes that providing population projections for areas that the Town does not have jurisdiction over, without public consultation, and without a regional growth strategy is not preferable.		
10.	Marvin notes that the Town is striving for 33-35 units/ha in areas of new development, as well as infill areas. This is the break even density for public transit, corner stores etc - not bylaw, but is in the Town's development guidelines.		
11.	Courtenay doesn't have target density, per se,		
12.	Need to balance overbuilding / under utilizing new infrastructure, particularly when looking at long range (50 plus year) – will excess capacity be utilized before service life of the infrastructure has lapsed?		
13.	Kevin suggests that final study, if scope is not expanded, should include "what if" sections on this impact of some of the bigger (Sage Hills) developments on the regional system.		
14.	Comox to provide population projections similar in format to Courtenay, MCSL to assist if requested.		
15.	RDC-S to provide population projections based on current OCP/zoning for areas shown as future annexation lands by Comox, Courtenay. Study to utilize the denser of Courtenay/Comox or RDC-S projections for said lands in study.		
16.	RDC-S OCPs to be reviewed and possibly revised following the completion of regional growth plan, water and sewer studies.		
17.	Next meeting tentatively scheduled for the week of March 17th. Date, time and location to be forwarded to all parties when available.		

Meeting adjourned at 3.30 p.m.

These Minutes are considered to be a true and accurate recording of all items discussed. If there are any errors or omissions they shall be brought to the attention of the writer within 10 working days; otherwise, these Minutes shall be deemed correct by all present.

Bob Hudson, EIT, Project Manager

McElhanney

TELECONFERENCE MEETING MINUTES

Project Name:	**COMOX VALLEY SEWERAGE MASTER PLAN UPDATE PROJECT**		
Location:	**MCSL OFFICES**		
MCSL Project Number:	2211-46970-0	Date: July 11, 2008	Time: 1:30 p.m.
Attendees:	Ian Whitehead, P.Eng., MCSL, iwhitehead@mcelhanney.com Bob Hudson, EIT, MCSL, bhudson@mcelhanney.com Al Gibb, P.Eng., Dayton & Knight, agibb@dayton-knight.com Shelly Bayne, P. Eng, EBA, Sbayne@eba.ca		
Distribution:	All attendees plus Ron Neufeld, P.Eng, CSRD, rneufeld@rdcs.bc.ca Glenn Westendorp, Town of Comox, westendorp@comox.ca Kevin Lagan, City of Courtenay, klagan@courtenay.ca		

	ITEMS DISCUSSED	Action By	Due Date
1.	The general intent of the meeting is to ensure the consulting team has a clear understanding of the changes in overall scope and schedule having been agreed to with the owner, has info needed to complete the project, establish any support needed from MCSL, to review progress to date, the procurement sequence, the schedule overall and the schedule for coming month.		
2.	In order for Shelly to move forward, the following info is required: • Any available mapping of in ground disposal potential for the study area. • List of background reports. • Any information from the local health unit regarding existing problem areas (D&K to contact VIHA directly). • Probable areas of growth over study horizon. • Existing system mapping and study area(s), core and expanded. • Comox studies for Lazo area.	**MCSL / CVRD**	
3.	EBA GIS group to create composite mapping indicating the potential for in ground disposal, based on above info including general soils conditions, area of known system problems, etc.	**EBA**	

495 Sixth Street
Courtenay, BC, V9N 6V4
Ph: 250-338-5495
Fax: 250-338-7700

www.mcelhanney.com

McElhanney

TELECONFERENCE MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
4.	EBA will require 6 weeks to deliver this information; target is for end of August, noting Shelly will be on holidays from July 19th to Aug 5. EBA focus to include areas already developed at relatively high density but not yet sewered (risk assessments).		
5.	Laura at EBA is the mapping contact, information to be forwarded to her directly as received.		
6.	Next consultant coordination meeting scheduled for Aug 08 at 1:30 to review progress.	**Group**	
7.	D&K require the following information to move forward: • Digital base map defining the area of the study, including sewer systems for expanded study area. • Descriptions of any community sewer and/or smaller/satellite treatment systems. • Data on Cumberland wastewater system - process diagram, populations, flows, loads, capacity etc. • Regional growth, planning, land use, OCPs, population projections, etc. for revised study area. • Growth areas and containment boundaries, etc. • CVWPCC drawings, reports, flow diagram, design info; as discussed AI will call Ron to see if we can contact Jim Elliot directly for this info. • MCSL Sandwick, Meadowbrook and Huband Local Area Studies 2004-2006. • Novatech, 1992, Impact of connecting Cumberland and Royston to the CS Regional Collection System and WWTP • Review of outfall by Komex, 2001. • Village of Cumberland LWMP. • Saratoga/Miracle Beach Sewage Collection System Study, Koers, March 2005. • Stage 1 Saratoga-Miracle Beach MSR Treatment Plant Registration Project. • PDFs of any LAPs or OCPs not already in hand.	**MCSL / CVRD**	
8.	Next scheduled meeting with D&K August 8, 1:30 to review progress	**Group**	
9.	MCSL to set up meeting with CVRD (Tom Knight, Ron Neufeld, Russ Hotsenpiller) to discuss population projections for outlying areas, use of existing LAP/OCP and zoning information for population projections, existing treatment systems, and the work that has been done for the Saratoga Beach and RID/Union Bay treatment systems (compile population maps thereafter).	**MCSL**	

McElhanney

TELECONFERENCE MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
10.	MCSL to contact the Village of Cumberland regarding obtaining a copy of Their LWMP, any other pertinent information	**MCSL**	
11.	Regular consultant meetings to be held via teleconference every month to ensure progress is consistent with project schedule.	**Group**	
12.	MCSL to revise the overall project implementation schedule and distribute to consulting team and client contacts.	**MCSL**	

Meeting adjourned at 1:30 p.m.
Next meeting schedule for August 8/08.

These Minutes are considered to be a true and accurate recording of all items discussed. If there are any errors or omissions they shall be brought to the attention of the writer within 10 working days; otherwise, these Minutes shall be deemed correct by all present.

Bob Hudson, EIT

McElhanney

MEETING MINUTES

Project Name:	**COMOX VALLEY SEWERAGE MASTER PLAN UPDATE PROJECT**		
Location:	**CVRD OFFICES**		
MCSL Project Number:	2211-46970-0	Date: July 21, 2008	Time: 10.00 a.m.
Attendees:	Tom Knight, CVRD, tknight@comoxvalleyrd.ca Jim Elliott, CVRD, jelliott@comoxvalleyrd.ca Russ Hotsenpiller, rhotsenpiller@comoxvalleyrd.ca Ian Whitehead, P.Eng., MCSL, iwhitehead@mcelhanney.com Bob Hudson, EIT, MCSL, bhudson@mcelhanney.com		
Distribution:	All attendees plus Ron Neufeld, CVRD, rneufeld@comoxvalleyrd.ca Kevin Lagan, City of Courtenay, klagan@courtenay.ca Glenn Westendorp, Town of Comox, gwestendorp@comox.ca		

	ITEMS DISCUSSED	Action By	Due Date
1.0	**GENERAL**		
a)	Tom to have RD planning technician overlay land usage information on cadastral mapping provided by MCSL and RD LAP drawings. Population projections to be developed jointly thereafter, utilizing the design populations developed in previous LWMPs, LAPs, etc. RD noted that electoral area plans retain the real detail. Agreed that a second meeting is required as soon as land use information is collected and overlaid. Regional Growth Strategy (RGS) MOU now signed by all local municipalities. Future defensible applications for development will be measured against the RGS. RGS will drive, to some extent where, when and how outlying (unincorporated) lands are developed within the RD.	**CVRD Planning**	
b)	The RD looked at reducing the Saratoga Beach service area to increase feasibility as an adjunct study – prepared by Dave Forgey & Associates. Copy of report to be forwarded to MCSL	**RDCS**	
c)	RD staff noted that some LAPs are out of date, having been prepared 10 to 15 years ago and will require scrutiny. RD staff to provide updated land use and population info for study, per item 1 above		
d)	Planning staff suggest that Electoral Area Plans should be used where possible as they have more detail than LAPs. CVRD to provide hard copies of all EAPs to MCSL	**RDCS Planning**	
e)	RD staff note that the Regional Growth Strategy, and particularly the MOU recently signed, gives other member municipalities much greater say in urban type development in historically rural areas. This will affect		

495 Sixth Street
Courtenay, BC, V9N 6V4
Ph: 250-338-5495
Fax: 250-338-7700

www.mcelhanney.com

MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
	future land use		
f)	Report needs to address the RD's design requirements for private vs. public treatment systems.		
g)	Komex has completed a Stage 1 EIS as part of the RD's pre-registration under the MSR, Stage 2 underway now (late 09 done).		
h)	RD noted that study may require higher level of treatment, partially due to Gooey duck bed at edge of IDZ		
i)	RD noted that the Brent Road treatment plant likely does not have sufficient space for UV disinfection, nor would function well without significant work to treatment chain. Chlorination/ dechlorination is not popular with the ministry.		
j)	Komex EIS to look at incremental flows up to 3X existing.		
k)	MCSL requested TRM mapping of the study area, RD only has 20m contouring, not useful in this instance.		
l)	The RD noted that there are several known areas of concern, relative to breakout, namely Saratoga beach Marsden/Arden area Huband and Meadowbrook area		
m)	Jackson Drive treatment system - RD to provide information to D&K.	**CVRD**	
n)	Ronna Rae Leonard – door to door program. Gradients of septic issues. Promoting septic health. Needs assessment study. • Marsden/Arden • Saratoga/Miracle Beach • Huband area (MCSL to ask R.R. Leonard for this).	**R.R. Leonard**	
2.0	**SARATOGA BEACH**		
a)	Associated Engineering prepared a servicing study for a reduced Saratoga area in (YEAR?) CVRD to find and forward this document to MCSL.	**CVRD**	
b)	Saratoga/Miracle Beach area treatment, = membrane bio reactor as planned for. Plant was sized – in ground disposal was noted in study.		
c)	Russ H. has powerpoint presentations for referendums in the following areas, to be forwarded to MCSL: a) Saratoga b) Marsden/Arden (Stage 1) c) Meadowbrook/Northern Area D d) Union Bay	**Russ H**	
d)	Cowling private treatment system, study prepared for the developer, included an extended service area which would take in a portion of the Saratoga Beach area.		
e)	Saratoga sewerage from proposed treatment plant to be discharged to Black Creek, partially to augment low summer base flows. High level treatment uses proposed.		
f)	Saratoga sewer service area included roughly 700 – 750 homes (assumed 5% growth).		
g)	RD staff note that the Area D director wants to consider Oyster River/Saratoga Beach as one area when developing servicing studies,		

McElhanney

MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
	capital works plans. Agreed that Oyster River residences to be added as point loads, whereas collection system beyond scope of this study		
h)	Referendum failed by roughly 2/3 1/3 split in Saratoga.		
3.0	**MERVILLE AREA TO LITTLE RIVER**		
a)	Bates Beach/Williams Beach/Kitty Coleman and Seal Bay/Little River are growth nodes that need to be addressed through this study. No previous work has been done in these areas.		
b)	Area C director very much against ALR removal. For purpose of this study, all ALR lands assumed to remain as such.		
4.0	**ROYSTON AND UNION BAY**		
a)	RID/UBID referendum did not include an outfall in Baynes Sound. Discharge was to be to Washer Creek. RD staff think that ministry approval of creek or land discharge will be difficult to obtain. NovaTech did qualitative analysis and public input work.		
b)	RID/UBID referendum initially looked at STEP system, in the end went with MBR. Estimated cost = $24k/door +/-.		
c)	RD staff noted that the Trent River is presently overloaded with nitrogen and phosphorus from the Cumberland treatment system, this may preclude discharge by other users/municipalities.		
d)	Sage Hills: Upwards of 4,000 residential equivalent units. Discharge to Trent not advisable, due to high existing phosphate load from Cumberland.		
e)	Kensington? Mt. Washington?		

Meeting adjourned at 2.30 p.m.

These Minutes are considered to be a true and accurate recording of all items discussed. If there are any errors or omissions they shall be brought to the attention of the writer within 10 working days; otherwise, these Minutes shall be deemed correct by all present.

Bob Hudson, EIT

McElhanney

MEETING MINUTES

Project Name:	**COMOX VALLEY SEWERAGE MASTER PLAN UPDATE PROJECT**		
Location:	**CVRD OFFICES**		
MCSL Project Number:	2211-46970-0	Date: August 12, 2008	Time: 2:00 p.m..
Attendees:	Tom Knight, CVRD, tknight@comoxvalleyrd.ca Rob Milne, CVRD, rmilne@comoxvalleyrd.ca Bob Hudson, EIT, MCSL, bhudson@mcelhanney.com		
Distribution:	All attendees plus Ian Whitehead, P.Eng., MCSL, iwhitehead@mcelhanney.com Allan Gibb, D&K, agibb@dayton-knight.com Jonathan Knudsen, D&K, aknudsen@dayton-knight.com		

	ITEMS DISCUSSED	Action By	Due Date
1.0	**GENERAL**		
a)	Per Rob, concern that development will be driven by servicing, thought to be given to servicing existing development nodes with failing septic systems as this could inadvertently encourage development/densification in areas that would otherwise remain rural.		
b)	planning staff agree that ALR lands will remain such in perpetuity; no further development anticipated, save for carriage houses, and a few large lot (>20 acre) subdivisions.		
c)	Existing zoning throughout the RD lands north of the "blue/green" area will not allow for further development.		
d)	Conflicts with First Nations and shellfish farming industry are likely in areas south of Courtenay. Development will likely be held to a higher standard (storm water management, sanitary sewer discharge etc) in these areas.		
e)	Staff feel that the days of 5 acre lots are passing. People are more interested in <1 acre lots, or larger estate/farm properties - "too big to mow, too small to farm".		
f)	Per CVRD staff, development west of the Inland Island Hwy not supported by CVRD, or Courtenay.		
g)	Sage Hills and Kensington data previously supplied by the CVRD.		
2.0	**SARATOGA BEACH**		
a)	Growth is expected in this area. It is already underway.		
b)	Population projections provided are likely conservative, given the +/-400 ha of land that Raven FP own.		
c)	Resort development forthcoming - discussion regarding the total		

495 Sixth Street
Courtenay, BC, V9N 6V4
Ph: 250-338-5495
Fax: 250-338-7700

www.mcelhanney.com

McElhanney

MEETING MINUTES

	ITEMS DISCUSSED	Action By	Due Date
	number of units expected, and the impact that development will have on summer population fluctuations. Resort/ time shares will increase the winter populations; expect approximately 125 units from golf course, 150 from Pacific Playgrounds, 200 from Emerald Estates.		
d)	Growth on the west side of the hwy not anticipated or supported by staff at this time.		
3.0	**KITTY COLEMAN AREA**		
a)	Staff do not anticipate further development, or infill in the reference area.		
b)	There is however +/- 550 ha of land that could be subdivided into 20 acre parcels under current zoning.		
4.0	**CUMBERLAND**		
a)	Not discussed, MCSL has a handle on anticipated growth.		
5.0	**RID/UBID**		
a)	MCSL population estimates based on LWMP work by Koers, adjusted to include revised Kensington numbers and south Courtenay annexation area.		
b)	Infill development along the waterfront from Courtenay to UBID assumed to be 500 units over the study horizon. Staff believe that this is reasonable, would equate to +/- 7 Crystal Shores type development of equivalent.		
c)	Development in the Baynes sound areas will likely be political, pressure from the shellfish farming industry and first nations expected.		

Meeting adjourned at 3.30 p.m.

These Minutes are considered to be a true and accurate recording of all items discussed. If there are any errors or omissions they shall be brought to the attention of the writer within 10 working days; otherwise, these Minutes shall be deemed correct by all present.

Bob Hudson, EIT

McElhanney

MEETING MINUTES INTERNAL

Project Name:	**COMOX VALLEY SEWERAGE MASTER PLAN UPDATE PROJECT**		
Location:	**CVRD OFFICES**		
MCSL Project Number:	2211-46970-0	Date: Sept. 29, 2008	Time: 9:30 a.m.
Attendees:	Jim Elliott, CVRD, jelliott@comoxvalleyrd.ca Ian Whitehead, MCSL, iwhitehead@mcelhanney.com Bob Hudson, MCSL, bhudson@mcelhanney.com Mark DeGagne, MCSL, mdegagne@mcelhanney.com		
Distribution:	**INTERNAL**		

	ITEMS DISCUSSED	Action By	Due Date
	Courtenay Station		
1.	General lack of redundancy appears to be primary issue with pump station. Minimal wet well storage (see note below), connections immediately upstream of PS, no overflow etc.		
2.	Camera the Courtenay River siphons - may be possible to isolate flows into each of 2 siphons for better video.		
3.	Capacity of the siphons not known, theoretical calculation needed.		
4.	Flow tests, pump tests to be arranged. No pump output flow records, testing in the past. Will try with single and two pumps running. For model calibration and to assist with assessment of overall flow discrepancy, as has been identified when comparing to flows entering the WWT plant.		
5.	Jim notes that there is approximately 15-20 minutes of wet well storage during average day flows, 1.5 hrs during low flow periods.		
6.	Wet well is flooded once per month to clean.		
7.	VFD pumps with soft start and stop - 3 x 200HP, possible to plumb in a fourth?		
8.	No discharge flow meter at station.		
9.	Pumps plug frequently due to lack of screen and low operating speed, sets off alarms every 2 weeks +/-.		
10.	Dose with FeCl2 for corrosion protection and odour control.		

495 Sixth Street
Courtenay, BC, V9N 6V4
Ph: 250-338-5495
Fax: 250-338-7700

McElhanney

MEETING MINUTES INTERNAL

	ITEMS DISCUSSED	Action By	Due Date
11.	No SCADA, staff has to visit pump station daily to record flows, etc.		
12.	Jim's Scada wish list: Pump amperage, Pressure out. Pump hours' Etc.		
13.	Structurally the building appears to be in good condition, significant settlement noted outside of the building.		
14.	Steel pipe corrosion testing needed downstream of patched/repaired section.		
15.	What about pipe from siphon to the pump station? Condition assessment ASAP?		
16.	Wet well expansion options to be explored. Influent flow splitting? Need for mixing pumps?		
17.	Jim notes that more interaction is needed between RD and City staff regarding the City's trunk sewers and siphon upstream of the plant		
	Comox (Jane Street) Station		
1.	H2S problems at Jane st.-HMCS Quadra forcemain in was once the outfall to goose spit from Comox. Result is large diameter pressure sewer, with high H2S content.		
2.	No FeCl2 injection at Jane Street.		
3.	Straight wet well design with 3 submersible pumps, (2 on at any given time, the third is standby, rotated weekly).		
4.	No hammer issues noted.		
5.	Biofilters used to control odour "custom mix".		
6.	RD and DND negotiating for replacement of the pipe from HMCS Quadra station. 50/50 proposal and 3 years negotiation.		
7.	Flow tests could be done, to calibrate mag meter.		
8.	Modeling of peak flows with all pumps running, at all stations, as compared to modeling of a few days of typical flows, wet weather and dry weather. Outcomes and objectives?		
	CFB Comox Station		
1.	Big I&I from 19 Wing Comox.		
2.	No soft start/stop.		

McElhanney

MEETING MINUTES INTERNAL

	ITEMS DISCUSSED	Action By	Due Date
3.	Wet well design with submersibles.		
4.	Wet well in good condition, no H2S or corrosion issues.		
5.	Significant storage in gravity main.		
6.	On average, pumps run 1 hr per day.		
7.	Town is looking to extend the sewer up Knight Road and toward PMQ's.		
8.	Flow tests needed for model calibration. Influent flume but no outgoing measurements. Need to measure pressure also.		
	General comments/discussion		
1.	MSR will take permit 45/60 to 45/46. BOD/TSS. Likely.		
2.	Remember to include Colby Station and HMCS Quadra station in the overall model.		
3.	MSR will require I&I plans. City will need to do some more in-stream flow monitoring as part of this?		
4.	Concept of capacity in the incoming gravity lines. Need to model this. Need to consider with respect to alternates for upgrading.		
5.	System redundancy represents big $$.		
6.	RD as gravity sewer owner/operator?		
7.	RD to own and operate the siphons and gravity mains toward Royston, likely? implications as to O&M costs, equipment needs, etc.		

Meeting adjourned at 11.30 a.m.

These Minutes are considered to be a true and accurate recording of all items discussed. If there are any errors or omissions they shall be brought to the attention of the writer within 10 working days; otherwise, these Minutes shall be deemed correct by all present.

Bob Hudson, EIT

WEDLER ENGINEERING	DATE: Sep 20, 2010	MEETING NO: Review **Sewerage Master Plan (SMP)**

MINUTES OF MEETING

LOCATION Wedler Engineering, Courtenay BC

PRESENT

Andrew Gower, Wedler	Kevin Lorette, CVRD	Marc Rutten, CVRD
Jim Elliot, CVRD	Ian Whitehead, McElhanney	Bob Hudson, McElhanney
Al Gibb, Dayton & Knight		

REMARKS: Meeting held to discuss the finalization of the SMP, scheduling and any extras.

CIRCULATION TO ALL PERSONS ABOVE EXCEPT:

WRITTEN BY: Andrew Gower, Wedler Engineering

ITEM	DESCRIPTION	ACTION BY
	Review of status/ General concept for Completion • Status of the Regional Growth Strategy reviewed. Still set to be complete by December 31, 2010. No significant changes predicted. Board meeting of 21 Sept 2010 expected to confirm schedule for completion of RGS. • Regional Water Supply Strategy – currently at 90% completion. Awaiting comments from municipalities. • Desire is to complete a report that is strictly technical in nature. Kevin Lorette to confirm if this approach is acceptable. • Fee budget remaining as of this meeting for the consulting team is on the order of $4,000. This will be sufficient to cover remaining "minor housekeeping" items and provide copies of the final report. • Ian Whitehead also confirmed that the RGS input and tweak of the report and other items as outlined in the "comment summary table" will require additional fees to complete. • Jim Elliot requested that the final report be clearly aligned/cross referenced with the original terms of reference. • Core area routing option 6 to be analysed in further detail. • Jim Elliot to confirm details/factors to be considered in the analysis of Route 6. • Decision to be confirmed – the Sewerage Master Plan is to consider the settlement boundaries and population projections versus using the "Blue-Green" map for the core area. DCC calculations for the core area to be based on this or the "Blue-Green" boundary with RGS growth projections? • South Area – proposals by KIP as captured in the draft Master Development Agreement and an updated report by Koers to be sent to MCSL in order to properly complete the SMP. • North Area – Saratoga Beach Estates project goes to the Board for potential 3rd reading September 21. Available details will be furnished, however the SMP will have to proceed to completion largely independent of this development.	Kevin Lorette MCSL MCSL Jim Elliot CVRD Marc Rutten
	Review of MCSL Letter dated August 27, 2010 Comment Summary Table • All items listed as "minor housekeeping – per budget" were deemed acceptable as were the items from the letter specified as "not additional scope". • 5 year, detailed capital plan is considered and "extra" item. (table item 68) • IRM / IRR discussions to be left at a high level / commentary only. (table items 16, 41, 63 and 68) • Core area - Route 6 – additional analysis to be priced as an extra item. (table items 20-25 and 32-34).	

Review of MCSL Letter dated August 27, 2010 Comment Summary Table (con.'t)

• RGS growth boundaries and population projections to be used for finalizing the SMP. (table items 40, 42 and 45).	
• Further investigation and confirmation of the current status of the Village of Cumberland's plans to be included in the final report. Wedler to follow up with Cumberland's engineer and confirm the Village's current direction. (table items 6 and 46)	MCSL Wedler
• Review of sustainability strategy to remain at a high level / commentary only (table items 16 and 41)	
• DCC's or CICC's for outlying areas (i.e. outside of the "core area") are not to be included. It was determined that it is quite premature at this stage to attempt to prepare this in the absence of even proposed service areas. (table item 51, 61, 62 and 63)	
• To confirm – no public consultation will be conducted at this stage. This will be brought forward when service areas for new treatment plants or expansions are determined.	
• Komox First Nations issues / development proposals to be comments on only and information as to their status to be included in the covering staff report for the SMP.	CVRD
• Wedler to follow-up with all municipalities for comments on the draft report and tech memos.	Wedler
• MSR commentary to be strengthened in the final report (table item 13).	
• I & I commentary to be strengthened/clarified. (table item 15)	
• Land acquisition costs not to be estimated / included due to the volatility of the market (table item 37).	
• Core area routes to remain numbered options (table item 39).	
• Per item 52 – the use of marine outfalls in the study "for costing purposes only" to be emphasized.	
• Per item 59 – the MDA and updated Koers study of the UBID / RID area to be provided for review.	CVRD
• Per item 70 - Recent EIS on the existing outfall to be provided for incorporation into the final report.	CVRD
• Staff report that will cover the SMP when it goes forward will provide general clarification on the purpose of the SMP, the level at which estimates/designs have been provided and the next levels/steps required in sewerage planning.	CVRD

Schedule for Completion

- Proposal is due by the close of business on Monday, October 4, 2010.
- Will be presented to the steering committee on Tuesday, October 14, 2010.
- Sewage commission requirement to be determined.
- Will be reviewed by the Committee of the Whole on Tuesday, October 19, 2010 (this is the only meeting in October – notes say 'end of October).
- CVRD to provide go ahead by Monday, November 1, 2010.
- Draft sewerage master plan will be completed by Wednesday, December 15, 2010.
- Comments will be required by Friday, January 14, 2011.
- Final report will be completed by Tuesday, February 1, 2011.
- The CVRD board will be presented the final report at the February 2011 meeting.

Next meeting: Late October (TBC)

600 Comox Road, Courtenay, BC V9N 3P6
Tel: 250-334-6000 Fax: 250-334-4358
Toll free: 1-800-331-6007
www.comoxvalleyrd.ca

Comox Valley REGIONAL DISTRICT

Meeting Notes

FILE:

DATE: June 8, 2010- **REPLY DATE 27 AUGUST 2010 – ADDED COLUMNS AND COMMENTS [MCSL/D&K]**

TO: Kevin Lorette

Cc: Meeting Participants

FROM: Marc Rutten

RE: **CVRD Staff Review – Comox Valley Sewer System Master Plan**

Meeting Dates: February 2, 2010 & March 1, 2010

Present: Jim Elliott, Mike Zbarsky, Marc Rutten

A review of the Comox Valley Sewer System Master Plan (SMP) was completed over two afternoons, one on February 2nd and the other on March 1st, 2010. The following notes summarize the discussion. Some of these comments and questions may repeat others previously sent.

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
1	The CVRD Sanitary Sewer Master Plan needs to be a 'stand alone' master plan	**X**	**X**				ADDITIONAL SCOPE, IF FUNDING & FINANCING ARE TO BE CONSIDERED	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	such that the format, layout, information, and especially recommendations etc. are clear and enables CVRD to easily move forward with planning, financing, designing, etc. The current report is more of a study and needs to be modified into a plan						FURTHER.	
2a	Upon review of the McElhanney proposal and the original scope of work contained in the RFP it appears that some deliverables have yet to be met. The following items require more attention (i.e. recommendations... details of works...) in the final report (plan): a. The issues around on site systems (task 2.4c) b. I&I reduction strategies (task 3.6), while included in tech memo they are not in the master plan and given that I&I represents 50% of the flow it needs to be included.			**X** **X** **X**			WILL BRING FORWARD FROM TECH MEMO INTO MAIN BODY OF REPORT.	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	c. The need for clear thresholds (population/effluent volume etc.) which would dictate what/when system extension/upgrades get completed... ('go/no go' as discussed in task 3.4a)							
2b	Issues of system ownership, apportioning of O&M costs, capital funding formulas, etc…(activity 5). Some of this is mentioned in the 'discussion paper' and needs to be resolved and recommendations brought forward into the master plan (same goes for many of the other things in this paper, such as policy around the proliferation of smaller 'community' systems).						WE AGREE, BUT IT WAS DECIDED BY STAFF THAT THESE ISSUES WOULD BE DEFERRED.	Defer
3	The conclusion that outfalls are the recommended method of discharge needs to be reviewed (modified) as no real analysis has taken place to determine this (though a discussion by			**X**			WORDING CLARIFICATION ONLY.	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	D&K is included in tech memos). CVRD is not opposed to these but there are other options that need to be considered. Further, of all the recent proposed WWTPs and engineering studies, none have proposed outfalls. This statement rings true for the conclusion that secondary treatment standards are recommended…this too has not been analyzed and conflicts with all of the work done recently on WWTPs in electoral areas and the CVRD sustainability strategy (i.e. they all recommend tertiary/reclaimed). The scope of the sewer master plan was high level such that these were not to be determined definitively…this would occur upon site specific design…so it should be clear that the plan is not endorsing or recommending specific details of WWTPs…but could provide guidance at a high level.							

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
4	References to CVRD undertaking LWMPs (currently or in the future) should be removed or mentioned merely as an option. LWMPs are a provincially guided and ultimately approved process and we are not currently involved in any…and it is unclear that we would want to in the future.			**X**				Reflected in draft SMP
5	IRM section states that it cannot be justified in financial terms…recommend restating or removing this as this statement is not based on any analysis whatsoever. Very clearly IRM would need to be based on a cost benefit analysis and business case…			**X**			THE REPORT NOTED IRM/IRR COULD LIKELY NOT BE JUSTIFIED BASED SOLELY ON COST RECOVERY.	Reflected in draft SMP
6	Assumptions and Limitations: a. Has Cumberland agreed that they need to connect to the south treatment plant within 5 years? Currently Cumberland is				**X** **X**		NEEDS TO BE TOUCHED ON AGAIN, FURTHER TO WEDLER'S RECENT DISCUSSIONS WITH CUMBERLAND. D&K TO COMMENT	Further detail required from Cumberland

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	aggressively campaigning the province and MOE to implement a sewer solution for them that could take them out 20 years, or more. However Cumberland has also suggested that they would connect to a regional system more quickly if it were ready. b. Is a marine discharge the only option of outfalls above a certain population? What is, or is there, a maximum population before a marine outfall is required?						FURTHER.	Reflected in draft SMP
7	Every table, map, evaluation matrix, etc referred to in the final draft report needs to be brought forward from the tech memo's into the report to eliminate the need to 'flip forward' to the tech memos to find the						AGREED WE WOULD NOT DO THIS. CROSS REFERENCING TO BE CHECKED AND ENSURED COMPLETE.	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	information. Tables and maps should be inserted into the final report adjacent to where they are referenced. General comment on maps – clean up the maps to be consistent and clear. All maps to use consistent line types, line weights and colours and for the map legend to be consistent between all maps. Currently the line weights and types are not the same as those shown in the legend. Also, use better technique's to depict whether flows discharge into pump stations or whether a pump station discharges into a forcemain to augment the flow. As a general comment on the maps remove the very 'thick' line weight used for the Kitty Coleman line to the CVWPCC. The final report should be issued in a large 3 ring binder as a standalone document will all relevant tables, maps, etc included in the report. The reference			**X** **X**				

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	materials, tech memos, etc should be included in a separate binder.							
8	Pg. 9 states that the Saratoga WWTP is to be CVRD owned…we need to be a bit careful with this statement given recent development project discussions in this area			**X**			CVRD STAFF TO PROVIDE MORE DIRECTION. [AND RELATED TO KENSINGTON] CVRD TO PROVIDE DIRECTION AS TO SYSTEMS THEY ARE AGREEING TO ACCEPT OWNERSHIP OF.	Reflected in draft SMP
9	Page 11 – if designing for the future, should we be designing for lower I&I targets assuming that newer systems will have less I&I?						A CENTRAL ASSUMPTION IN THE STUDY NOTES THAT I&I WILL AT BEST BE MAINTAINED AT CURRENT LEVELS, OVER TIME.	Reflected in draft SMP
10	Page 12, third bullet, by upgrading the pumps at the CFB Comox Pump Station the peak capacity will be 200l/s. How many years does this add to the pump station – 20 years?			**X**				Reflected in draft SMP
11	Bring table 11 from tech memo 1 into the draft plan			**X**				Not relevant to final report
12	Page 12 - CVWPCC loading						ADDITIONAL TEXT	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	levels – the numbers listed here are assuming the plant is registered under the MSR. This comment should be brought forward from the tech memo into the draft report. Also some of the capacity analysis (e.g. pg 12) is not clear…CFB gravity 'may' not (may not if what)….CFB forcemain design flow is…(but what is current status). WWTP capacity needs to be put in context (e.g. according to MSR) and confirmed (differences with our understanding of capacity).			**X**			REQUIRED TO EXPLAIN HOW MSR REQUIREMENTS WERE INCORPORATED INTO THE WWTP CAPACITY ANALYSIS	
13	Need to include some commentary on the MSR in the final report: a. What is it b. Are we going to need to register our plant under the MSR c. How has the SMP considered and incorporated the MSR d. Are we going to need to register under some other form of regulation				**X**		ADDITIONAL DISCUSSION CAN BE ADDED, REGARDING NEW FEDERAL REGULATIONS SCHEDULE TO BE ENACTED THIS YEAR. Some of this was covered in the MSR discussion in memo 1	Additional section added to draft SMP Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	e. How are the regulations changing and what are the implications of those changes on our treatment system(s).							
14	Page 14, section 2.1.5 – table is titled ...reduction targets, but there are no targets in the table?			**X**			RENAME THE TABLE	n/a
15	In section 2.1.5 we need to further discuss the need to reduce I&I. Provide an appropriate target for our system (Comox and Courtenay) and make recommendations for how to achieve those targets. Provide a cost comparison between reducing I&I vs. Building larger conveyance and treatment infrastructure.		**X**				TECH MEMO DEALS EXTENSIVELY WITH I&I ISSUE. COULD INCLUDE SOME GRAPHICS AND COMMENTARY RELATIVE TO DIMINISHING RETURNS OF COSTS FOR I&I REDUCTION VS COSTS OF INCREASING SYSTEM CAPACITY, ETC.	SMP updated
16	Discuss other 'water saving' ideas like low flow toilets and shower heads. How does the cost of retrofitting the entire community, compare with the cost of upgrading our sewer				**X**			Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	infrastructure.							
17	The SMP needs to be much stronger on I&I reduction. We need to thoroughly understand the benefits of reducing I&I vs. the cost of larger infrastructure.						PER ITEM No. 15 ABOVE	Reflected in draft SMP
18	Page 17, 2.1.6, assemble the information in a tabular format with required dates of replacement.			**X**				Reflected in draft SMP
19	Core area route selection criteria needs to be brought forward.				**X**			Reflected in draft SMP
20	CVRD concerned about pumping sewage from sea level at the Courtenay Pump station to a Geodetic elevation of 70m (230 ft). What type of pump will be required for this? Are there examples of these pumps running now (in other parts of north America)? The cost of energy must be very high for this option, especially considering it would need to be pumped again through the CFB station. How sensitive is this option to		**X** **X**				THESE ISSUES ARE COVERED IN THE TECH MEMOS. IN ADDITION, IT WAS AGREED AT 17 JUNE MEETING THAT ROUTE OPTION 6 SHOULD BE BROUGHT FORWARD AS A FORMAL OPTION, COSTED OUT AND EVALUATED VIA MATRIX MEANS. ROUTE 6 ANALYSIS, SURVEYS, INITIAL EIS ASSESSMENT IS ADDITIONAL SCOPE.	See Route 6 analysis

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	higher future energy costs? What is the HP required per pump? Also both Courtenay River and Jane St. PS are deemed to be at capacity yet upgrades are not discussed as being needed for some time… what is the strategy for managing in the interim or deferring upgrades (e.g. I&I reduction, water conservation etc.). This goes too for other components (e.g. forcemains) which 'could' be prolonged if….							
21	Does the existing foreshore route from the Courtenay pump station, along the foreshore (including the Willmar Bluffs) section, have the lowest overall capital and pumping costs. How does it rank for interference with utilities etc.		**X**				SAME COMMENT AS 20.	See Route 6 analysis
22	Is there an acceptable material and method to use along the Willmar Bluffs section that would essential		**X**				THE FOCUS HERE IS A HIGH LEVEL 50 YEAR PLANNING DOCUMENT.	SMP document reflects

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	make the installation as environmentally sound as any of the other alternatives. What about HDPE pipe with Gabion baskets installed at installation?							
23	If the Docliddle pump station were built and Courtenay and Comox pump stations discharged into it, what does that do for the Courtenay and Comox pump station and forcemain capacity. We are assuming that the shorter pumping distances would increase the life of these existing pump stations.				**X**		UPGRADE DEFERRAL POTENTIAL TO BE CHECKED AND COMMENTED ON.	See Route 6 analysis
24	If the forcemain was twinned only as far as Docliddle pump station, what does that do for the capacity of Courtenay and Comox pump stations.				**X**		ALREADY ANSWERED, BUT COULD BE FURTHER INDICATED.	See Route 6 Analysis
25	If Docliddle was built at the same inlet elevation as the current discharge head, how much lift is required from Docliddle (what HP pumps?)				**X**		HEAD/DISCHARGE RELATIONSHIP BETWEEN 2 STATIONS AND OPTIMIZATION OF HEAD DIFFERENTIAL TO BE MODELED.	See Route 6 analysis

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
26	The comparison tables shown on pages 27-29 need to show all of the options, including options 3 and 3A.			**X**				Report layout amended
27	Please refer to the Croteau station as the Docliddle station to reduce confusion. Also, please clarify in the recommended options whether Docliddle is included.			**X**				Reflected in draft SMP
28	When recommending routing option No. 1 have all of the following additional costs been included: a. Docliddle station b. Upgrade to CFB station c. Upgrade (twinning) to the Knight road sewer currently being installed by Comox d. Installation of the south arm of the greenwood trunk						YES, WILL CLARIFY IN TEXT.	Reflected in draft SMP
29	Does the Docliddle pump station eliminate the need for the Comox Pump station? Can all of the flow						NO, THE JANE PLACE STATION IS STILL REQUIRED.	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	from Comox be diverted by gravity to the Docliddle station or is the Comox pump station on Jane place still required?							
30	On page 18 you recommend completing a cost benefit analysis of gravity diversion options be undertaken at the "pre-design" stage. The three options mentioned have a large impact on the size of the southern treatment plant or pumping station. Doesn't this analysis have to happen before you can recommend the south treatment solution?						AS DISCUSSED, DIVERSION CANNOT OCCUR UNTIL A SOUTH HAS BEEN DECIDED UPON. THE COST / BENEFIT ANALYSIS, AT PREDEsign STAGE, WILL ASSESS IMPACTS ON STP SIZING, DEFERRAL OF UPGRADES AT COURTENAY P.S. AS DISCUSSED, THE COURTENAY P.S. REQUIRES SOME UPGRADING IN THE VERY SHORT TERM, AND THE DECISION REGARDING A SOUTHERLY STP MAY NOT HAVE OCCURRED AT THAT TIME. DEALING WITH MATTERS OF URGENCY, OVER TIME, MAY AFFECT THE LEGITIMACY OR COST EFFECTIVENESS OF SPECIFIC LONGER TERM OPTIONS.	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
31	Page 19, 2.2.2, 2nd bullet – what have these repair works consisted of. Is this the placement of 'gabion baskets' or was the line repaired? We now survey the line once per year to determine the amount of cover over the line. It is our understanding that if the line remains covered it will not erode quickly.						WE WERE TOLD AT THE OUTSET OF THIS PROJECT THAT A PRIORITY WOULD BE TO EVENTUALLY ABANDON THE WILLEMAR PRESSURE SEWER, OR AT LEAST PROVIDE A REDUNDANT ROUTE. (2.5 KM OR 1.7 KM) TO BE CHECKED.	Reflected in draft SMP
32	Page 19 – last paragraph "...we understand CVRD staff wish to explore the opportunity to remove the forcemain in its entirety from the Comox Harbour waterfront..." I'd like this issue discussed further in the SMP. What is the real risk to keeping or twinning the existing route. Can those risks be eliminated by engineering solutions?, etc. not staff direction.				**X**		FAIR COMMENT.	See Route 6 analysis
33	In routing option 2 – why not keep the existing forcemain routing as shown in option no. 3 to the new Docliddle pump station, or conversely if this routing is not acceptable than why		**X**				THE EXISTING FORCEMAIN IN OPTION 3 WAS TO BE ABANDONED, OR KEPT FUNCTIONAL FOR REDUNDANCY ONLY. USING THE	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	show it for option 3?						FORESHORE ALIGNMENT FOR A NEW FORCEMAIN WAS NOT CONTEMPLATED AS PART OF OPTION 3.	
34	Page 21, 2.2.3.6, why is route 6 not shown as an option on a map and included in the evaluation matrix. It is likely that this option would score high. Has it been excluded because it does not completely eliminate the foreshore route. Even though this option is not formalized on a map or in the report, it is still included as a sort of secondary recommended route and is to be included in preliminary design. This is confusing. It would be better if the SMP produced some clear direction on core area routing. Route 6 should be formalized within the report and included in the evaluation matrix.		**X**				AGREED	Reflected in draft SMP
35	What is the preferred location for south treatment plant. The SMP references this as Royston in one place			**X**			TO BE REVIEWED AND REVISED AS NEEDED TO ENSURE	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	and Union Bay in another.						CONSISTENCY. I.E. AT CENTROID OF FUTURE POPULATION BASE OR AT NORTH END OF KENSINGTON DEVELOPMENT.	
36	Page 23, 2.2.4.4, 3rd bullet - ...'Option 2a has the greatest potential to capitalize on integrated Resource Management. In general, the greater the number of treatment facilities, the higher the potential for IRM..." Is this a true statement – page 32 contradicts? Would there not be some benefits to having a larger plant. In fact – don't you need to have a plant over a certain size to gain some economies of scale for composting and for energy production?			**X**			WILL REVIEW AND REVISE, IF NEEDED.	Reflected in draft SMP
37	Page 24 – land acquisition costs could be significant. Should these (or estimates of these) not be included in the analysis?				**X**		LAND COSTS CAN BE ADDED, PRESUMING THE RD CAN PROVIDE UNIT COST FOR LAND [$/Ha].	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
38	Page 24, 2.2.5, last bullet, why do this? Be consistent throughout with the inclusion of engineering and contingency.			X				
39	Is it possible (or helpful?) to assign names to the Core Area Route numbers to reducing the amount of 'flipping' required to determine which rout number is for which route.				X		NOT REALLY AN ISSUE, BUT COULD COME UP WITH SOMETHING UNIQUE FOR EACH ROUTE. NOTE THAT WE HAD REFERRED TO THE VARIOUS ALIGNMENTS AS (ROBB RD, FORESHORE, ETC) INITIALLY. WE CAN GO BACK TO THIS IF THE RD PREFERS.	n/a
40	Page 31, 2.3.3, We realize that these statement about settlement patterns probably predated the RGS but now that the RGS is almost complete all settlement patterns mentioned in this document should be aligned with the RGS.		X				AGREED.	Not included in scope
41	Page 33, 3rd bullet from top, is this likely to be true? Higher GHG emissions when employing IRR techniques? I think we need						DAYTON AND KNIGHT TO COMMENT FURTHER.	Report updated

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	to be careful including statements like this in the SMP.							
42	Page 34, 2.3.6, RGS – rework this section to now include the population growth projections and special distribution contained in the RGS.		**X**				AGREED.	Not included in scope
43	Page 36, bottom of page, drawing O5 missing from CVRD copies dated June 23, 2009.			**X**			OKAY.	n/a
44.	Page 39, 2nd bullet, we are not collecting CICC's in the way from areas outside the core but that will eventually be annexed into the core. Can CICC's be set up in this way. Should we be setting them up this way for all RGS lands identified as settlement expansion area?					**X**	RECOMMENDATIONS REGARDING CICC'S WERE MADE IN THE REPORT AND APPENDICES/TECH MEMOS. FURTHER DISCUSSION ON THIS, IS BEYOND THE SCOPE OF ASSIGNMENT (SEE COVER LETTER BULLET ALSO, DATED AUGUST 27, 2010).	Reflected in draft SMP
45	The SMP references the Blue/Green map in several places and shows the Blue/Green map over-laid on several SMP maps. Should we replace all		**X**				AGREED.	Not included in scope

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	references to the Blue/Green map with reference to the RGS maps and include all settlement expansion areas as future contributory flows to the CVWPCC. This would tie the two documents closely together and generally clean things up.							
46	Page 43, 3rd paragraph, "...It has been assumed Cumberland will connect to the CVRD system when the population reaches 5000 people. This assumption is predicated on the constructed treatment wetland concept not being favoured as a long term solution by the Ministry or Environment..." Does this mean that the existing Cumberland system, as is, is capable handling 5000 people, or will Cumberland need to make other improvements in the mean time?				**X**		CUMBERLAND'S SITUATION IS NOT STATIC. THE BEST WE CAN DO IS MAKE COMMENT ON EXISTING CONDITIONS AND EXPECTED LONG TERM REQUIREMENTS FOR CUMBERLAND. OUR UNDERSTANDING IS THAT CUMBERLAND INTENDS TO AUGMENT PROCESS IN THE SHORT TERM AND CONTINUE TO DISCHARGE TO THE LAGOON SYSTEM, ALLOWING FOR SOME GROWTH, PERHAPS IN EXCESS OF 5,000 TOTAL POPULATION.	Update included in draft SMP
47	In a couple of places it is mentioned that 'temporary'						SPECIFIC ISSUES NEED TO BE FURTHER	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	facilities would be built and/or 'interim' upgrades constructed that in both cases would not be required upon implementation of larger regional system. I would not recommend these fairly capital intensive 'throw away' projects…especially given the magnitude of costs for a regional system and the impact on taxpayers. Same case in Cumberland with their constructed treatment wetland.						IDENTIFIED BY RD STAFF FOR COMMENT.	
48	Page 44, "...a second outfall at 47,000..." – CVRD feels that the current outfall ok to 65,000 or 53,000 with gravity only.			**X**			WE REQUEST THAT THE RD PROVIDE BACKGROUND TO ASSERTION REGARDING OUTFALL CAPACITY. ANALYSIS CAN THEN BE REVIEWED AND REVISED, IF JUSTIFIED.	Clarified in draft SMP report
49	DCC's – should the upgrade of Jane Street pump station be included in the DCC list. SMP needs to be clear on what needs to happen at Jane Street for the preferred option.						THOUGHT WAS THAT JANE STREET WILL NOT REQUIRE UPSIZING [IE: DCC WORTHY] BUT RATHER, WILL REQUIRE MAINTENANCE OVER TIME TO	Clarified in draft SMP report

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
							ACCOMMODATE THE EXISTING SERVICE POPULATION WHICH IS NOT EXPECTED TO GROWTH APPRECIABLY.	
50	The June 23rd, 2009 version of the report is missing appendix M table 28. Should be inserted after page 54.			**X**			CAN'T EXPLAIN THIS, ERROR IN COPYING OF RD'S HARD COPIES?	n/a
51	The core area DCC projects should be separated from the Rural area DCC projects and provided on two separate lists. The list is only for 10 years – why not longer. The rural area treatment plants will have separate service areas and separate DCC bylaws, both from each other and from the CVWPCC. Update costs to 2009 or 2010 dollars, refine population estimates and remove completed projects.		**X**				SEE BULLET PERTAINING TO DCCs IN ATTACHED MCSL LETTER, DATED AUGUST 27, 2010.	Reflected in draft SMP
52	The sewer master plan recommends marine outfall for all new treatment facilities. The plan should include a discussion and		**X**	**X**			DEVELOPING COSTING FOR OTHER OPTIONS IS ADDITIONAL, AS D&K DO NOT HAVE SITE SPECIFIC, DETAILED	Clarified in draft SMP report

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	pro's / con's analysis of alternate discharge solutions. Discharging into Baynes sound will be very difficult.						INFORMATION IN HAND, SUCH AS WOULD BE NEEDED TO RATIONALIZE AND COMPARE IN GROUND DISPOSAL, IRRIGATION POTENTIAL, STREAM AUGMENTATION, ETC. CONVERSELY, SIMPLY DESCRIBING OTHER OPTIONS, IN GENERAL TERMS, WOULD NOT BE ADDITIONAL.	
53	Page 47, why are we recommending option 3A as opposed to option 3, when the NPV of option 3 is lower than 3A. Need to provide a very strong argument for this decision.						RATIONALE AS STATED WAS PRIMARILY ONE OF CASH FLOW BETTER MATCHING EXPECTED REVENUE STREAM FROM DEVELOPMENT ACTIVITY, THEREBY REDUCING BORROWING COSTS, ETC. RECALL CLASS 'D' ESTIMATES ARE +/- 50%.	Clarified in draft SMP report
54	Page 46, first paragraph, why does land availability at Brent road have a bearing on the ability to compost the solid waste into the future? Composting is performed off site.			**X**			WILL REVIEW AND REVISE TEXT, AS NEEDED	Clarified in draft SMP report

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
55	Table 22 and 23 missing – page 46			**X**			COPYING ERROR.	n/a
56	Page 47, 3.2.4, 3rd bullet – why is this upgrade required. One of the Aeration basins is not in service.			**X**			WILL CONSULT WITH RD STAFF, THEN REVISE TEXT AS NEEDED.	Clarified in draft SMP report
57	Page 48 – Clarify in the SMP that the existing plant is at capacity. Let it be understood that a new facility is required. The land is available to build another plant. The existing plant cannot be expanded further.			**X**			WILL CONSULT WITH RD STAFF, THEN REVISE TEXT AS NEEDED.	Clarified in draft SMP report
58	Page 50 – odour should not be a disadvantage as it shouldn't be any more of a problem than now.			**X**			WILL CONSULT WITH RD STAFF, THEN REVISE TEXT AS NEEDED.	Clarified in draft SMP report
59	Page 52, Option 3a – why would the developer provide a treatment plant that would be decommission in the future. Why would the developer not provide an expandable plant?		**X**				AGREED, BUT AS DISCUSSED, A PLANT INITIALLY SIZED TO SUIT 1,500 PEOPLE WILL NOT EFFECTIVELY BE EXPANDED UPON TO EVENTUALLY SERVE 25,000 PEOPLE THIS IS A TOPIC WE SUGGESTED BE	Associated Engineering to comment

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
							DISCUSSED WITH THE DEVELOPER ASAP.	
60	Page 53, 2nd bullet from the bottom. This bullet comments that Option 3A may allow the elimination of need for the Docliddle pump station. Isn't the Docliddle pump station required in all cases where the foreshore line along Willmar Bluffs is to be relocated?			**X**			THE DOCLIDDLE PS IS ONLY REQUIRED IF FLOWS FROM COURTENAY, [AND SOUTHERN AREAS], ARE TO BE CONVEYED ALONG THE WATERFRONT. OPTION 5 DRAINS BY GRAVITY TO A POINT NEAR THE FORESHORE, THUS NEEDS TO BE PUMPED AGAIN AT DOCLIDDLE. UNDER ALL OTHER OPTIONS, IT IS NOT REQUIRED. THIS NEEDS TO BE MORE CLEARLY ARTICULATED.	Clarified in draft SMP report
61	Page 54, 3.5, 1st bullet – can we create a new DCC bylaw for areas outside of the current sewer service area if we have not established a sewer service area. Can we introduce a new DCC bylaw for areas that we know we want to make into a service area. Are we allowed to do this?		**X**				INITIAL COMMENTS ON THIS ISSUE ARE PER THE MCSL LETTER DATED AUGUST 27, 2010 ACCOMPANYING THIS TABLE. THE ISSUE REQUIRES FURTHER DISCUSSION WITH RD STAFF. ALSO SEE BULLET #44 HEREIN.	Agreed to defer

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
62	Page 54, 2nd to last bullet – Assuming that each service area has their own DCC bylaw (CVWPCC, Roy/UB, Saratoga) what does this bullet mean?				**X**	**X**	THE ISSUE IS ONE OF THE SEWERAGE COMMISSION MANDATE AND GEOGRAPHIC AREA OF INFLUENCE. THE QUESTION APPEARS TO IMPLY THE SEWAGE COMMISSION MANDATE WILL BE INCREASED TO INCLUDE OUTLYING AREAS? THE BULLET REFEREED TO WAS INTENDED TO SUGGEST THAT PEOPLE FURTHER OUT FROM A SOURCE OF TREATMENT MIGHT PROPERLY NEED TO PAY MORE FOR NEW SERVICE. (REQUIRES FURTHER DISCUSSION).	Agreed to defer
63	DCC project list – the DCC project list does not show some of the smaller projects that are discussed in the report like upgrading the pumps at Courtenay pump station which needs to happen right away. How are DCC's collected for these projects.		**X**				SEE LETTER TO THE RD DATED MAY 12, 2009, IN WHICH DCC ISSUES, 5 YEAR CAPITAL PLAN, AND ASSIGNMENT SCOPE ARE DISCUSSED.	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
64	Pg. 56 states that developer demand for service will precede funding or public health related impetus for regional system south of Courtenay. I would remove the reference to public health as it could be said that there already is a public health impetus (as well as an environmental health impetus). ..otherwise why are we pursuing that service area already (and have been for years).			X			AGREED.	Reflected in draft SMP
65	If the flow from Courtenay pump station goes up and over and into the Greenwood trunk, then the CFB Comox pump station is going to become very large. Is this not a major negative to the routing options that put all of this flow into the Greenwood trunk?						YES, BUT THESE COSTS HAVE BEEN ACCOUNTED FOR.	Reflected in draft SMP
66	Reference is made to Ships Point and the ability of option 3A to service Ships Point. What does the SMP recommend – Should Ships Point be serviced?			X			IT LARGELY DEPENDS ON WHERE THE SOUTHERLY TREATMENT PLANT IS LOCATED. BUT, AGREED THIS REQUIRES BETTER	Clarified in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
							CLARITY.	
67	On routing option 1, is the intent to bring the flow from Jane St. PS back through the proposed new route? The document refers to the core area route which I assume means Jane St (Comox) flows as well as Courtenay flows. Please clarify and comment on impact on the rest of the system if Route 1 is only Courtenay flow. i.e. what does that do for Jane St. PS. capacities and upgrade requirements. Also if Route 1 is only Courtenay is the intent to maintain the existing route as a redundant system or decommission?			**X**			FLOWS FROM JANE ST CAN BE PUMPED TO THE DOCLIDDLE SYSTEM, BY UPGRADING PUMPS, ETC ONLY. NO NEED TO CONSTRUCT DOCLIDDLE PS IN THIS CASE. IN ALL CASES/OPTIONS, IT IS PREFERABLE TO KEEP THE FORESHORE SYSTEM IN PLACE FOR REDUNDANCY.	Clarified in draft SMP
68	Recommendation #3 is to commission a 5 yr capital plan…this SMP should provide us with what we need to do this ourselves. A SMP is meant to provide a somewhat definitive high level plan to move forward…not recommend a whole bunch of further		**X**				SEE MCSL LETTER TO THE RD, DATED MAY 12, 2009, IN WHICH A 5 YEAR CAPITAL PLAN IS DISCUSSED RELATIVE TO STUDY SCOPE.	5 Year Capital Plan now underway as a sepatate initiative

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	studies/engineering work.							
69	Recommendation #4 states that we should not consider opportunities for a joint system in Saratoga with SRD's area D. Why? There is a dense area directly on the other side of the Oyster River that is experiencing onsite failures. And there is precedent with the Black Creek/Oyster Bay water LSA spanning boundaries.			**X**			MINOR TRIBUTARY AREA OF JOINT JURISDICTION MAY WELL BE FINE. WE WERE REFERRING TO THE OPPORTUNITY, NOW NO LONGER AVAILABLE AS FAR AS WE ARE AWARE, TO POTENTIALLY HAVE PUMPED SEWAGE TO THE C. RIVER STP.	Reflected in draft SMP
70	Finalized SMP needs to have incorporated results of recent outfall EIS		**X**	**X**			RD STAFF TO PROVIDE SPECIFICS AS TO RECENT OUTFALL 'EIS'. IF THIS IS FOR THE MAIN WWTP [BRENT ROAD], WE WILL INCORPORATE DISCUSSION INTO THE REPORT, PRESUMING THE EIS REPORT DOES NOT CALL FOR MORE STRINGENT EFFLUENT STANDARDS THAT THOSE USED FOR PLANT ANALYSIS TO DATE. CONVERSELY, IF THE EIS CALLS FOR	Reflected in draft SMP

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
							ADVANCED TREATMENT, THIS COULD REPRESENT A SIGNIFICANT ADDITIONAL WORK ITEM.	
Appendix O:								
71	CVRD can provide some clarity around what we are planning to do for the North and South areas 1. We are currently working with developers to provide the 'design and installation of treatment plant and discharge capable of being expanded to a population of (4,500 Saratoga and 11,000 Roy/UB). 2. The RGS does not allow the construction of private wastewater treatment plants to service development. 3. SMP should make a recommendation to control onsite septic systems 4. SMP should make recommendations on			**X**	**X** **X**	**X**	OKAY.	

		Scope/Contract Status						
Item	**Description**	**Per Original T.O.R. & Budget**	**Add'l to Original T.O.R. & Budget**	**Minor House-keeping – Per Budget**	**Minor House-keeping – Add'l Items**	**Agreed to be Deferred to Later Date**	**Comments**	**Current Status as at 2011**
	Governance.							

Submitted by:

Marc Rutten

MCSL REF #	Town of Comox Comments - additional comments in **green bold**		Comments in **red-bold** are additional from the MCSL.	Comments in **red-bold** are additional from the CVRD.		
	Section	Comment	MCSL Response	Project Manger Response	MCSL Action/Description	Action By
1	**1.0**	Page 2, Paragraph 3 - Report Reads "**However, Option 3a remains a valid alternative to Option 3 and should not be discounted until such a time as a marine outfall to Baynes Sound, or beyond, is proven feasible.**" As it is Option 3a that involves the marine outfall, should this not read "However, Option 3 remains a valid alternative to 3a"?	Minor text amendment required		Minor text amendment	MCSL
2		Page 2, Bullet 4 - Have we not already satisfied ourselves to the need for relocating the Willemar Bluffs length of the force-main? I would not agree with this recommendation. **We only need another study on the condition of this pipe if we intend an un-specified delay for the abandonment of this pipe. Exposure of this pipe can take place in a single storm season precluding the cost effective and environmentally sound replacement of the same. The potential jeopardy that this critical link in our system is in has been acknowledged and studied. Our Commission has granted priority to this project. Of all projects to be delayed due to cash flow, this is not the one!**	The recommendation was largely to develop a timeline for replacement. This could significantly alter cash flow, and or upgrade sequencing.	Now that MCSL has the most recent report on this issue, it is expected that the timing for replacement can be further detailed.	Minor text amendment	MCSL
3	**4.0**	Page 30, 4.3 - Has any allowance been made for current or future lands held by the Komox First Nations (KFN)?	Not explicitly. However, future KFN lands are coincidental with the study area, and therefore included. Minor text to be added		No Action - MCSL was explicitly instructed to exclude KFN development from the SMP	
4	**5.0**	Page 37, paragraph 4 - I do not agree with the recommendation for additional study on the Willemar Bluffs section of the forcemain. Please refer to the recommendations contained in the December 2005 CH2M Hill report "Forcemain realignment Study" and the earlier July 2003 report by Northwest Hydraulics Consultants "Erosion Counter measures at Comox Forcemain". I would also note that the Docliddle Station would allow for interception of an existing 1300 SFR units thus freeing up capacity in the Jane Street pumping station.	Understood	As MCSL now has the latest study, additional commentary and clarification can be added. However, if it is feasible, and far less costly to maintain a portion of the foreshore alignment (per Core Routing Option 6) it would be advisable to pursue that option.	Minor text amendment	MCSL
5		Page 43 - Please add "Odour Control" and "Building and Site aesthetics" to the list of major criteria to be addressed within the design of this station.	To be added to final report.		Minor text amendment	MCSL
6	**7.0**	7.2, Page 75, Bullet 5 - "Upgrading of the Jane Street…concurrent with the construction of the Docliddle pump station". This statement is not supported by earlier analysis involving a wet well pump station at elevation 12.0m. Such a station would simultaneously intercept 1300 SFR (190 ha), two schools (including a Senior Secondary) and improve the pumping capacity of Jane Street lift station. It is also worth noting that a further 40ha of additional lands with potential for development would also be removed from the area tributary to the Jane Street pump station. **When we speak of "existing" capacity, what are we talking about? Surely, not the proposed Docliddle pump station. If we are talking about the need to re-establish redundancy at the Jane Street station, then the removal of 1300 SFR can only help and may at the outside delay the need. If we are suggesting that the proposed Docliddle station cannot be built to handle the flow of these 1300 SFR units then we have a major problem as Jane Street is simply going to send it back to Docliddle anyways. In summary, it makes no sense to let the flow of 1300 SFR units and 190ha of land base bypass Docliddle only to be sent through two pump stations rather than one.**	The redirection of gravity flows potentially tributary to the Docliddle station has not been assumed to be coincidental with the construction of the Docliddle station. Further, CVRD staff have expressed concern over the station's existing capacity. The MSR requirement for 50% redundancy will ultimately govern.	This level of detail appears to be better suited for a preliminary design study specific to the pump stations in question. **You could still make the comment in the SMP that if some of the tributary flow currently contributed to the Jane place PS were redirected to the Doclittle PS, then the Jane Place pump station life may be extended.**	Minor text amendment	MCSL
7	**8.0**	8.1, Page 77, Bullet 6 - IRM's analysis should be specific to the jurisdiction under which the treatment plant falls. For example, IRM analysis for the Brent Road treatment plant should remain the sole responsibility of those who do or will contribute to it.	This is an issue best addressed through the Commission?	It can be safely assumed that cost sharing for any new infrastructure will be based on the area serviced. This would include IRM design and implementation.	No Action - to be adressed by the commission	CVRD
8		8.2, Page 78, Bullet 10 - As previously stated, I do not support this recommendation.	Understood		Minor text amendment	MCSL
9	**Option 3a**	In general the Town of Comox supports the tenets contained with Option 3a. This option relieves the current core users (Comox and Courtenay) from having to underwrite and finance large capital outlays specifically to provide capacity for relatively remote developments. This strategy also relieves Comox and Courtenay of the uncertainty that comes with the chance that much of this development may not take place or the timing of which does not coincide with the schedule of debt repayment. We would effectively be financing growth in areas outside of our respective jurisdictions where we have no control over the pace or scope of development. Option 3a provides the greatest opportunity for integrated resource management (IRM) likely involving the use of recycled water for golf course or "purple pipe" use. Additionally, a higher degree of capacity at the Brent Road facility is retained for use by Comox and Courtenay. Finally, 3a lends itself to the incremental construction and extension of a sanitary system to all jurisdictions south of Courtenay including the Village of Cumberland. I note that the development of an independent outfall and treatment plant is currently being pursued by the CVRD.		It does not appear likely that any existing users would be charged or have to pay for infrastructure that does not benefit them. This concept appears quite contrary to the Local Government Act and the requirements for Local Service Areas withing Regional Districts. Per the Act, Development Cost Charges for new developments (which are the growth that all of the options are designed around) would pay for the required infrastructure. This concept is the basis around which DCC's are calculated and DCC bylaws are written.	No action - comment is an observation, no direction provided	

10	**Greenwood Trunk**	During a recent meeting of the Comox Valley Operational Planning Committee (CVOP's), the concept of a forcemain/pump station option for the Greenwood Trunk (GWT) regional sanitary sewer was broached. I feel that this is a significant departure from what is currently contemplated in this draft. To properly assess the merits of proceeding with this change, I would request that this draft be updated to include an analysis of this revised alternative that addresses the following points: a) Where would the pump station be located? b) What additional areas within the blue/green map could be serviced by alternate locations for this station (e.g. Little River) c) How will areas intermediate to the station and the point of discharge to the gravity system be serviced? d) Effect on energy consumption and GHG production. e) Cost analysis consistent with the approach used in this study (capital, 50 year operating and net present value) should be completed and listed within this report.	More information is required prior to assessing this additional scope.	Per the original and revised TOR, this option would be new and would need to be addressed by a change order.	Change order required, extra scope	CVRD
MCSL REF #	City of Courtenay Comments					
	Section	Comment	Response			
11	**Appendix**	I would therefore recommend that because three and a half years have passed since the start of the study that there should be an Appendix in chronological order for the scope of work, proposal and key correspondence that amended these documents and the work plan.	To be addressed by the Project Manager. Minor text to be added to front end of report indicating scope changes, timing etc	All changes, proposals and letters are on file. These may be inlcuded with the final staff report.	No action - supporting documentation, proposals, CO's etc to be included in the covering staff report	PM
12	**Option 3a**	The Plan recommends Option 3a. At this time the CVRD has a LWMP nearing completion for the Royston/Union Bay area. I would recommend that the LWMP is completed to at least final draft stage to ensure that the two studies are compatible prior to finalizing the SSSMPU. I would also recommend that the SSSMPU includes a reference to the LWMP as the LWMP was underway prior to completion of the SSSMPU.	Client team to determine completion timeline and provide input to MCSL. This input is required prior to MCSL mobilizing staff to complete the final submission.	Further delay of the Sewer Master Plan will undoubtedly increase the cost associated with the project. Further discussion will be required however it is recommended that only commentary be added for now.	No action - disscussed in the "context" section of the report	
13		In Option 3 drawing No. 0-6 following page 58 shows pipe 9 from the high point in Cumberland leading to the pump station in Royston. I would have thought that there would have been sufficient head to take the sewage to Brent road by gravity. I realise that it is not a simple as that but has account been taken of the potential energy?	Consideration could (and should) be given to a utilizing potential energy in this system and the detailed design stage. Interception of gravity flows long the Royston Rd corridor should also be considered.	Given that this is a high level study focussing on conceptual details, the appropriate time to further review this is during detailed design of the specific project.	Minor text amendment	MCSL
14	**7.0**	Page 74, Bullet 5 - '…and expandable up the…' this sentence needs rewording.	Final document will be reworded as requested.		Minor text amendment	MCSL

MCSL REF #	Village of Cumberland Comments					
	Section	Comment	Response			
15	5.0	5.4.3, Page 59, Paragraph 4 - Report assumes that Cumberland would connect to a CVRD system once a population of 5000 is reached. I think it would be reasonable to expect that given favourable financial conditions, and suitable outcome of the LWMP process, Cumberland would connect to a regional treatment system as soon as it is available, to resolve phosphorus issues in the Trent River.	Noted.		CVRD to follow up with Cumberland as a separate iniative. The SMP provides a "snapshot" in time, circa 2009	CVRD
16		5.4.6.2, Page 61 - report refers to decommissioning the existing lagoons in Cumberland. Current thinking is that the lagoons would remain for a considerable period of time after connection to a regional treatment system. The existing lagoons will provide off-line buffering of short duration peak wet weather flows which can then be metered back into the regional treatment system during off-peak periods. Discussions are currently under way with MOE regarding design capacity of the regional plant vs interim provisions of an overflow of primary treated effluent (to MSR standards) to Maple Creek during extended WWF until I&I is reduced.	Analysis of the practical implications of utilizing wetlands exposed to precipitation and ground water influence as a storage basin is beyond the scope of the current assignment.	This would represent a sub-set of the current proposed solution. At the preliminary design stage once more details with respect to scheduling and proposed poulaton growth is known, this issue should be re-assessed. **Without any additional work I think a comment similar to the one provided by Bob can be included in the SMP.**	Minor text amendment	MCSL
17		5.6.4.1, Page 67 - Service to Cumberland is assumed to be required as soon as it is available, in order to resolve phosphorus issues in the Trent River.	Noted.		No action - CVRD to follow up with Cumberland as part of the South Courtenay Treatment Study	CVRD
18	7.0	7.3, Page 75, Last Bullet -The timing of Cumberland's treatment needs are clear. Improved treatment is needed now to resolve the issue of phosphorus in the Trent River. Additional capacity will be needed in order to accommodate growth. Any major capital expenditure needs to consider these elements to a typical design horizon 20 years or more.	Noted.		No action - CVRD to follow up with Cumberland as part of the South Courtenay Treatment Study	CVRD
MCSL REF #	CVRD Comments					
	Section	Comment	Response			
19	1.0	Page 1, Paragraph 4, Sentence 2 - Report mentions excessive erosion to the CVRD foreshore forcemain. This should be clarified so that it is clear that it is the surrounding material that is erroded not the forcemain itself.	Minor text edit required.		Minor text amendment	MCSL
20		Page 2, Paragraph 2, Sentence 3 - Typo option 3a and 3 are reversed. Sentence should read " **Service to Ships Point area is viable under Option 3**."	Minor text edit required.		Minor text amendment	MCSL
21		Page 2, Third Bullet - consider adding a comment that this analysis has been completed for the Royston/Union Bay area (the work by Payne Eng. as referenced in other parts of the SMP)	Minor text edit required.		Minor text amendment	MCSL
22	2.0	Page 3, Paragraph 1, Sentence 2 - Report States the CVWPCC was designed to accommedate flows from "**possibile settlement into outlying areas**". The CVWPCC was only ever envisioned to serve Courtenay, Comox, DND and KFN. I'm not sure it was ever intended to service "outlying areas". Please make sure this is an accurate statement.	The original "outlying areas" referred to the existing core area. Clarification will be provided.		Minor text amendment	MCSL
23		Page 3 - Add a statement in this section and throughout the document (if possible) that in general the SMP aligns with the proposed RGS in terms of spatial distribution of growth for the Comox Valley, however growth rates differ significantly… the recommendations made in the SMP are not likely to change based on the proposed RGS, however the recommended timing of projects could be affected….” A statement such as this would strengthen the SMP and show that it is in-line with other regional planning documents. McElhanney could include any necessary disclaimers saying that the SMP has not been updated using RGS growth projections.	The SMP and RGS are not aligned, in terms of population, or spatial distribution. We are not comfortable with this change. **Mark, a couple of notes regarding your comments related to population growth -** **- population estimates within the SMP and RGS are within 400 people at the 25 year horizon.** **- the RGS speaks of a reduction in growth rate, to 1% after 25 years, whereas the SMP growth rates vary by region, by are generally more consistent with historical averages.** **- if the RGS numbers are carried forward to 50 years, a total (CVRD) population of about 110,000 is expected, compared to the 160,000 in the SMP** **- not sure what the population used by associated is, but the population estimates in the smp (in the southern treatment plant catchment) were generally based on recently adopted zoning densities, with very modest growth beyond the build out of these newly zoned areas. In most cases, the growth rates beyond build out of these same areas is less than the historical average.** **- This obviously highlights the need to bring the population estimates in the SMP in line with those adopted by the Region.** **- initial infrastructure sizing, and "expandability" should, and can be, considered at the design stage. It is important to make sure that there is thought given to the realistic (but conservative) long term populations tributary, else we end up with a scenario such as at the CVWPCC where head works limit any further expansion of the plant, and we are now faced with building a second train, on a limited amount of land.**	Concur with MCSL - the SMP has been prepared using a different growth model than the RGS and saying that it is "aligned" would be potentially misleading. It is important to consider that either growth model - be it the one proposed in the RGS or the one proposed in the SMP and Regional Water Strategy are, at the most basic level, guesses. The fact that the growth predicted by the SMP is larger is appropriate as it means the infrastructure plan is more conservative (i.e. planning for larger growth which would avoid "under planning" which could lead to significant lack of investment if growth does happen at a higher rate). **I'm concerned that the large growth rate used in the SMP will not only provide conservative infrastructure but that it wll provide unaffordable infrastructure. We've just been through this on the South Regional Sewer Study. if we had used the projections in the SMP the project would be completely unaffordable to the residetns that ultimately pay.**	No action - a proposal was submitted October 2010 for this work and rejected by the client	

24		Page 4 - If possible add the RGS settlement expansion boundary map as an appendix to show how closely it aligns with the Blue/Green map used in the SMP	See above		No action - a proposal was submitted October 2010 for this work and rejected by the client	
25		3.1, Page 7, Paragraph 1 - Report States " Population growth over the preceding four years has been relatively constant, at 4%" - What source was used for this number?	As noted, this is an assumption, make in the absence of 2010 census data.		No action - detailed in Memo 1	
26		3.2, Page 8 - Explain why the Average Annual Per Capita Flow between tables 2 and 3 are the same for Courtenay and Comox. Are these numbers based on actual data? Comox #'s can be had by using volumes pumped even though peak is not recorded i.e. assume what comes in goes out (5.1.8 page 37 second paragraph)	Data within the "Average Annual Per Capita Flow" column was derived from actual flow data (pump station records) provided the CVRD		No action - detailed in Memo 1	
27		3.3.1, Page 10, CPS third bullet - Clarify that because of limited wet well capacity it is likely that both station will have to pump at the same time especially in high flow conditions	Minor text edit required.		Minor text amendment	MCSL
28		3.3.1, Page 10 - Include actual l/s rates for all pump stations noted	Minor text edit required.		Minor text amendment	MCSL
29		3.3.2, Page 12 - Comment on what the max l/s flows will do in terms of line pressure	Minor text edit required.		Minor text amendment	MCSL
30		3.3.3, Page 14 - Add a note that clarifies that table 6 only applies to the CFB Comox gravity sewer	A more prominent note indicating the table only applies to the CFB gravity sewer will be added.		Minor text amendment	MCSL
31		3.3.4, Page 15 - Comment on when (year) siphon will reach capacity.	Minor text edit required.		Minor text amendment	MCSL
32		3.3.5, Page 15, Bullet 6 (And throughout doc) - The **CVRD is not actively working to register the CVWPCC under the MSR** but rather we are considering our options, one of which is registering under the MSR. This language should be softened throughout the document. **CVWPCC has had a pre-registration meeting but no decision has been made if or when to proceed with an MSR registration**. Further note that an MSR registration will likely require effluent disinfection. **Comment on I&I reduction required under an MSR**.	Minor comment regarding the need to reduce I&I to comply with MSR can be added.	As consulting engineers, it is our duty to recommend to clients that any infrastructure be updated to meet current, up to date regulations and standards. I would not try and argue MCSL out of their recommendation that the Brent Road plant be updated and registered under the MSR - which is the most up to date regulation.	Minor text amendment	MCSL
33		3.3.5, Page 16, Bullet 1 - Should we also say that I&I flows are commonly at 3x and peak at over 4x.	Minor text edit required.		Minor text amendment	MCSL
34		3.3.5, page 16, Table 7 - According to Jim Elliot the Daf is at 100%, Report has it at 55%	OD&K to comment		Minor text amendment	OD&K
35	3.0	3.3.5, Outfall Capacity - The **current outfall is very near its stated capacity (60,000 m3/d)** based on recent storm events and PWWF. This section needs to be a bit more firm on **ensuring the reader understands that the outfall needs to either be twinned in the near future, or that other improvements are required to increase the capacity of the existing outfall, or that WWF's be reduced. Additionally a discussion regarding tidal influence on the outfall may benefit the reader.**	5 year capital plan is a more appropriate place to discuss replacement timing etc. Minor clarification regarding tidal influence can be added.	Concur with MCSL - more appropriate in the detailed capital plan. **Still don't aggree this should be more definative in the SMP.**	No Action - Per PM to be included in the 10 year capital plan	
36		3.3.5, Page 17, Paragraph 2, Sentence 2 - Report states that "**the CRVD should undertake further review of wet weather flows**" this should be done by the report not the CVRD.	The SMP is a high level planning document, this level of detail is beyond the current scope, and possibly more appropriately addressed by/through the member municipalities.	This reccomendation appears appropriate given the high level of this study and appears to be a reasonable ongong task for the CVRD and member municipalities to pursue. Management and response to I&I cannot be addressed in one report with one snapshot of the state of existing infrastructure, rather it has to be a continous process that becomes a part of regular operations.	No action - Per PM, the SMP is a high level study and the level of analysis provided is appropriate	
37		3.4, Page 17 Paragraph 2, Senctence 2 - Ensure that MSR revisions will include changes to alternate disposal requirement, commenter thinks otherwise	D&K to comment		Minor text amendment	MCSL
38		3.4, page 18 -Include ADWF #s for comparison.	D&K to comment		Minor text amendment	MCSL
39		3.4, page 18 - Refer to effluent disinfection options i.e. UV, Ozone	D&K to comment		Minor text amendment	MCSL
40		3.5.1, page 20, Last Bullet - To use this # to generate the graph gives a false impression. When considering the cost of I&I versus treatment you need to include the cost of constructing and maintaining additional infrastructure required to treat the Peak I&I	The unit treatment cost provided by the CVRD includes long term debt repayment, thus to some extent upgrade costs are accounted for. The example is intended to illustrate the protracted break even point for component replacements vs. treatment. Further analysis is beyond the scope of study.	It would appear the example given is a simplified analysis to demonstrate the value of I&I repairs over time. As it clearly makes its point, further refinement appears unessecary.	No Action - Per PM, the SMP is a high level study and the level of analysis provided is apporopriate	
41		3.5.3, page 24, Notes Section - Explain why 240 l/c/d is used for per capita flows. This seems low	Detailed explanation is provided in Memo 1.		No action - detailed in Memo 1	
42		3.5.3, page 24, Notes Section - Why do you say that I&I rate for CTY and CMX are expected to decrease over time? Don't rates increase as system ages?	Jane st. catchment rates are expected to decrease slightly over time, as I&I reduction measure are implemented. It is felt that the current I&I rate = 0.4l/s/ha can be reduced over time, notwithstanding the propensity for aging systems to develop higher I&I rates over time. Similarly, Courtenay I&I rates are being managed. However, the need for continued monitoring and reduction cannot be understated.		Minor text amendment	MCSL
43		3.5.3, page 25, Paragraph 1, Sentence 1 - Typo, Report reads "Caution should be also be excercised....." should read "Caution should also be excercised....."	Minor text edit required.		Minor text amendment	MCSL
44	4.0	4.1, Page 26 - Can tables throughout the document be updated to show the 25 yr projected population (for information only) to more closely align with the RGS and the south regional sewer study. The 50yr growth projections are very large.	Agreed project horizon was 50 years		Change order required, extra scope	CVRD
45		4.1, Page 26, Last paragraph -Why have upper bound estimates been based on a 4.5% growth rate – source?	Memo 1 established population projections, parameters		No action detailed in memo 1	
46		5.1.1, Page 32, Paragraph 4, Sentence 3 - "not yet suffering" remove the "yet"	Minor text edit required.		Minor text amendment	MCSL
47		5.1.2, Page 33 - Route option 1 – would the existing GW trunk section recently installed by the Town of Comox, and the CFB pump station need to be upsized to handle all of the flow from the Courtenay Pump station. If so, this should be mentioned here.	Minor text edit required.		Minor text amendment	MCSL

48		Page 33 - Discuss waste water pump limitations when pumping to 70m geodetic.	Minor text edit required.		Minor text amendment	MCSL
49		Page 33 - For each of the routes discussed and summarized state whether the Willemar bluffs bypass is still required or not.			No action - implicit in each route description, costs etc.	
50		5.1.6, Page 33, Sentence 2 - Report Reads "Simular to route 1,4 and 5..." however as this is route 5 there must be a typo in there.	Minor text edit required.		Minor text amendment	MCSL
51		5.1.7, Page 33, Paragraph 1 - Has the section of forecemain between Courtenay and Jane place pump stations shown any sign of erosion? If not, take out the word significant.	Minor text edit required.		Minor text amendment	MCSL
52		5.1.9.3, Page 42 - If the Jane Place pump station had a new, separate discharge to the new doclittle pump station so that the flow did not combine with that coming from the Courtenay pump station, how much smaller could the pumps at the Courtenay pump station be?	new scenario, could be analysed as extra scope	Concur - this request would expand the current scope of the study. **Hasn't this work already been completed by MCL for the most part? I remember seeing an analysis showing how each of the Courtenay or Jane Pl pump stations are affected by the other station being either on or off. Without completing an analysis could a comment be added stating that if pump station discharges were separated capacity increases could be expected?**	Change order required, extra scope	CVRD
53		5.1.9.3, Page 42 - Comment on size and cost of upgrades to Cty PS.	Better addressed in the 10 year capital plan	I believe table 15 on page 43 addresses thes questions.	No action - to be addressed in the 10 year capital plan	
54	5.0	5.1.9.3, Page 43 - Table 15 - Clarify pump replacement at CTY and size at CTY.	???		No action - to be addressed in the 10 year capital plan	
55		5.1.9.4, Page 44 - Expected construction cost s - Clarify that the 9million is only the PS not the line. Wh**y 50%** engineering and contingencies.	Agreed that class D estimates are appropriate at this level of study.		No action - previously agreed, Class D estimates are appropriate	
56		5.2.2, Page 49 - Does the Cumberland LWMP report not also discuss the WWF discharging from the current lagoons to Maple Lake Creek?	OD&K to comment		Minor text amendment	OD&K
57		5.2.6, Page 52, Paragraph 3, Sentence 1 – Is there capacity? How much? Based on recent storm events and PWWF isn't the outfall near capacity?	OD&K to comment		Minor text amendment	OD&K
58		5.2.7, Page 53 -KIP and SBE have not offered to provide sewer service to UBID and Saratoga / Miracle Beach, but rather have agreed to provide a treatment plant initially designed and constructed to be expandable to a regional treatment plant.	Minor text edit required.		Minor text amendment	MCSL
59		5.4.1, Page 58 - Table 20 - Clarify why Docliddle shows at 6 million...doesn't include engineering and contingencies?	correct - contingencies and engineering costs are introduced following comparison of options. The intent was to show the marginal increase in costs between options, at this level of detail. Introducing 50% eng and cont. creates a larger cost differential, thought to be misleading.		Minor text amendment	MCSL
60		5.6.4, Page 67, Table 25/Tabel 26 - The chronology in tables 25 & 26 doesn't seem to match the timing in the core area routing section. I thought when the doclittle pump station was constructed it extended the life of both the Courtenay and Comox pump stations, but the tables seem to indicate that Courtenany and Jane place pump station upgrades are required at the same time as the construction of the doclittle station.	The lack of redundancy in the Courtenay and Jane stations necessitates immediate replacement to meet MSR requirement of 50% redundancy. Both stations are in excess of 100% (theoretical) capacity at present.		Minor text amendment	MCSL
61	Core Area Route Matrix	Include costs on table (including Foreshore)			No action - Costs are detailed elsewhere within the document, matrices account for costing on a relative basis	
62	6.0	6.0, Page 70, Bullet 1 - Clarify...refers to forcemain from Courtenay to Docliddle ...then what is the reference to the Willimar Bluffs pressure section about?	Minor text edit required.		Minor text amendment	MCSL
63		6.1, Page 70 - Add wording on in-stream development as per paragraph 5 page 66 "It is of utmost importance in the negotiation.....risk of taking over ownership of substandard plant".	Minor text edit required.		Minor text amendment	MCSL
64		6.2, Page 71 - 20,000 people for biogas production seems low. Other work that we are currently completing on the south regional sewer project indicates that a population of 70,000+ is required before biogas production becomes feasible.	OD&K to comment		Minor text amendment	MCSL
65		6.3, Page 72, Bullet 3 - Please change the "5 year capital plan" to the "10 year capital plan".	Minor text edit required.		Minor text amendment	MCSL
66	Appendix M	Suggested DCC project list update – North outlying area – does the initial plant construction estimated at $11,200,000 include the collection system. If not, should it?	Local Collection has not been included anywhere within the study, as agreed.		Minor text amendment	MCSL
67	Throughout	All drawings that show the outfall extending from the CVWPCC into Georgia strait should be revised to first show the outfall extending along the beach for a few km's and then extending out into Georgia strait from Cape Lazo.	Minor edit		Small amendment to drawings - note these drawings are schematic only	MCSL
68		Ensure all map legends are updated	Minor edit		Minor text amendment	MCSL
MCSL REF #	Project Manager Comments					
69	Table 2 and Table 3	Using per capita I&I rates seems at odds to the standard practice of using total land area serviced for I&I rates. Please provide commentary as to why this method as been used (expansion of the note bvetween the tables should suffice).	Minor text edit required.		No action detailed in memo 1	

70	**Table 4**	For all pumps listed, please provide both desiognation and power rating.	Minor text edit required.		Minor text amendment	MCSL
71	**Section 3.3.3**	I understand that a major infrastructure upgrading project is either ongoing or pending at CFB Comox. Please provide information. If MCSL has no contacts, Wedler can explore this issue.	Project manager to explore	Information has been requested and will be supplied to MCSL for inclusion as commentary.	Minor text amendment	MCSL
72	**Section 3.3.4**	Is it "twinning" of the siphon that would be required or adding the proposed third conduit?	Third conduit…		Minor text amendment	MCSL
73	**Section 5.1.8**	Last bullet in the bulleted list - which "New Year" is being referred to? Please indicate the year (2012?).	This note is now dated, survey is to be completed in 2011 - Jim to verify		Jim to verify the date of inspection	CVRD
74	**Section 5.2.3 - Page 50**	A more specific reference to the current regulatory requirement of having an alternate discharge for the full design flow regardless of the level of re-use should be included here.	OD&K to comment		Minor text amendment	MCSL
75	**Option Analysis**	Table 16 shows the costs for options 1, 1a, 2 and 2a with each of the route options. Can route 6 and options 3 and 3a be added to this and follow-on tables? Also, it would appear to make sense to reorganize the report somwehat to have all six options (1, 1a, 2, 2a, 3, 3a) analysed inteh same section, rather than having 3 and 3a seperate. While it is understood this is they chronological order in which the options were developed, for the final report it makes more sense to have this work as combined and seamless as possible. i.e. roll section 5.4 into section 5.2/5.3. Add 3 and 3a to table 17 and 18 etc. Also, were options 3 and 3a only analysed using core area routing option 6?	Implies significant effort, beyond current scope	Based upon discussions with MCSL we concur.	No action - agreed with project manager the approach taken reflects chronology of the project, and refinement of the initial options presented	
76	**Core Area Route Matrix**	Please specify that the "Foreshore" option is "Route Alternate 6"	Minor text edit required.		Minor text amendment	MCSL
77	**Section 5.2.6 - 4th Paragraph**	Is there a possibility of "slip lining" the existing Goose Spit Forcemain? Commentary on the impact of Treaty Negotiations should probably be mentioned - no conclusions can be reached, but planning consideration must be given.	Per ToC comment, a note will be added re KFN. Slip lining is an option, however the FM sizing will limit its utility, long term.		Minor text amendment	MCSL
78	**Throughout**	In some places "IRR" is used, in others "IRM" - please be consistent. Also, in Sect 7 - Conclusions - "Integrated resource Recovery" is used, yet in Sect 8 - "Integrated Resource Management" is used.	Minor text edit required.		Minor text amendment	MCSL
79	**Section 5.4.4.1**	In Table 3, CVWPCC Ultimate Service Population is 160,0000, but in the paragraph below it is 160,300.	Minor text edit required.		Minor text amendment	MCSL

McElhanney

APPENDIX C

CVRD
SEWAGE MASTER PLAN
COMOX VALLEY WATER POLLUTION CONTROL CENTRE CAPACITY ASSESSMENT

DAYTON & KNIGHT REPORT

SEWAGE MASTER PLAN
COMOX VALLEY WATER POLLUTION CONTROL CENTRE
CAPACITY ASSESSMENT

OCTOBER 2008

DAYTON & KNIGHT LTD.
Consulting Engineers

Comox Valley
REGIONAL DISTRICT

SEWAGE MASTER PLAN
COMOX VALLEY WATER POLLUTION CONTROL CENTRE
CAPACITY ASSESSMENT

TABLE OF CONTENTS

TABLE OF CONTENTS (cont'd.)

LIST OF TABLES

TABLE OF CONTENTS (cont'd.)

LIST OF FIGURES

APPENDICES

Comox Valley
REGIONAL DISTRICT

SEWAGE MASTER PLAN
COMOX VALLEY WATER POLLUTION CONTROL CENTRE
CAPACITY ASSESSMENT

1.0 INTRODUCTION

The Comox Valley Water Pollution Control Centre (CVWPCC), constructed in 1984, treats sewage collected from the City of Courtney, the Town of Comox and CFB Comox. This review of the plant, as part of the Comox Valley Regional District (CVRD) Sewer Master Plan study, contains an assessment of the capacity of the existing plant and the current process loading. Future editions of this Memorandum (Activity 3) will investigate growth and expansion in the service area, and determine upgrades required at the plant to handle increased flows, as well as provide an estimate of the ultimate capacity of the site. Alternative sites for wastewater treatment facilities will also be investigated.

2.0 FLOWS AND LOADS

2.1 Population

The 2003 to 2008 CVWPCC service populations are given in Table 2-1 (from McElhanney).

TABLE 2-1
CVWPCC SERVICE POPULATION

Year	Courtenay	Comox	CFB Comox	Total
2003	19,111	10,197	968	30,276
2004	19,907	10,622	968	31,497
2005	20,736	11,065	968	32,769
2006	21,600	11,407	968	33,976
2007	22,500	11,760	968	35,228
2008	23,400	12,113	968	36,481

2.2 Flows

Plant flow records from January 2003 to July 2008 were analysed. Figure 2-1 shows the recorded daily flow. The permit discharge limit of 18,500 m^3/d is also shown (see Section 5 for further discussion of permit exceedence).

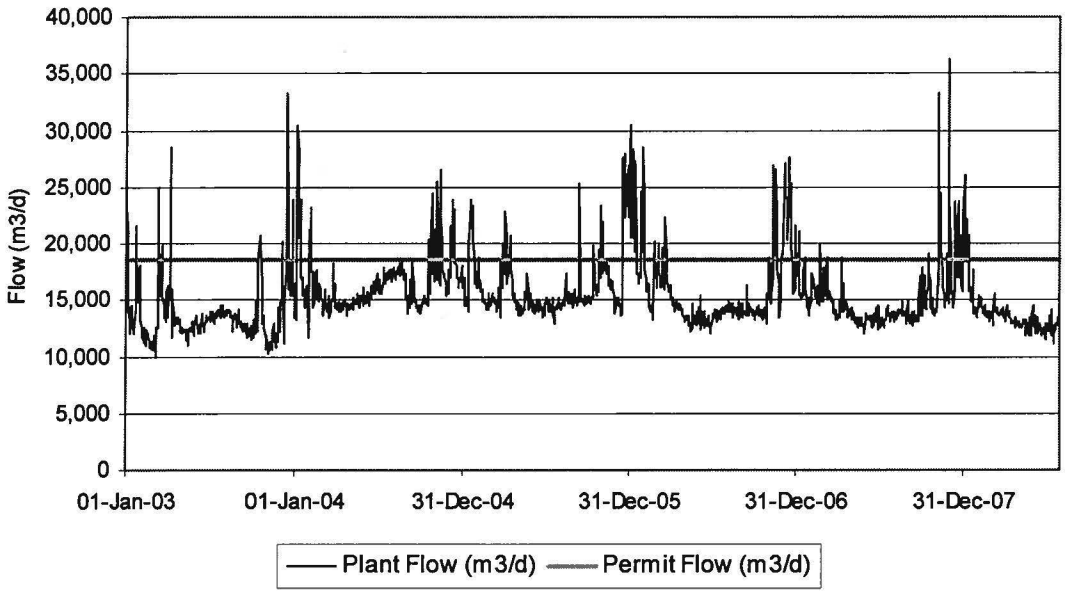


Figure 2-1 Plant Flow Record January 2003 – July 2008

The per capita flows for each year of record are summarized in Table 2-2. The per capita values will be used in Activity 3 to project future wastewater flows to the plant.

TABLE 2-2
PER CAPITA FLOWS TO THE CVWPCC

Year	Population	Average Annual Flow (L/capita/day)	Maximum Day Flow (L/capita/day)	Average Dry Weather Flow (L/capita/day)	Average Wet Weather Flow (L/capita/day)
2003	30,276	457	1,102	374	635
2004	31,497	520	969	458	607
2005	32,769	491	854	435	715
2006	33,976	472	898	388	710
2007	35,228	429	1,032	372	556
Average		474	971	405	645

Analysis of the data gave the following average values over the period 2003 to 2007 for the current flows to the facility:

- Average Annual Flow (AAF): 15.5 ML/d
- Maximum Day Flow (MDF): 31.7 ML/d
- Average Dry Weather Flow (ADWF): 13.3 ML/d
- Average Wet Weather Flow (AWWF): 21.0 ML/d
- Peak Wet Weather Flow (PWWF): 46.9 ML/d

The ADWF and AWWF were calculated as the lowest and highest 30 day moving average of the daily flow respectively. The PWWF was calculated from the flow recorder sheets. For each year from 2003 to 2007, several periods of sustained high flow (1 to 3 hours) were extracted from the sheets. The average of these was taken as the PWWF. The year 2008 to date was excluded as it provided only a partial data set. The historic flow data were used to project future flows to the plant in Activity 3.

Table 2-3 shows the MDF to ADWF ratio for the years 2003 to 2007. The MSR states that, where the MDF exceeds 2 times the ADWF and the contributory population exceeds

10,000 persons, the discharger must address how reduction of inflow and infiltration (I&I) can be addressed. The data shows that the plant regularly exceeds this ratio, so I&I must be addressed when the plant registers under the MSR.

TABLE 2-3
MDF AND ADWF RATIOS

Year	ADWF (ML/d)	MDF (ML/d)	MDF:ADWF
2003	11.3	33.4	2.9
2004	14.4	30.5	2.1
2005	14.2	28.0	2.0
2006	13.2	30.5	2.3
2007	13.1	36.3	2.8

2.3 BOD and TSS Loads

Plant records from 2003 to 2007 were analysed to determine current plant loading. The per capita mass loads of BOD_5 and TSS received at the plant from 2003 to 2007 are summarized in Table 2-4. The per capita values will be used on Activity 3 to project future loads to the plant.

TABLE 2-4
PER CAPITA LOADS TO THE CVWPCC

Year	Population	BOD_5 (g/capita/day)		TSS (g/capita/day)	
		Average	Maximum Month	Average	Maximum Month
2003	30,276	NA	NA	112	155
2004	31,497	123	259	138	296
2005	32,769	115	153	123	154
2006	33,976	109	135	119	161
2007	35,228	87	127	96	131
Average		109	169	118	180

Analysis of the data gave the following average values over the period 2003 to 2007 for the current loads to the facility:

- Average TSS influent load: 3,837 kg/d
- Average BOD influent load: 3,610 kg/d
- Maximum month TSS influent load: 5,841 kg/d
- Maximum month BOD influent load: 5,559 kg/d

The above average values are used in Section 6 of this report to evaluate the capacity of the existing plant.

3.0 REGULATORY REQUIREMENTS

Regulatory requirements for wastewater treatment are summarized in this section. More detailed discussion regarding the evolution of regulatory requirements is provided in a separate memorandum; these requirements will be applied to the development of wastewater management options in Activity 3.

3.1 Permit PE-5856

The Permit (Appendix A) requires the discharge from the wastewater treatment plant to meet the following criteria:

- Maximum discharge rate 18,500 m^3/d
- Maximum BOD 45 mg/L
- Maximum TSS 60 mg/L

The CVWPCC is currently working towards registration under the Municipal Sewage Regulation (MSR). A pre-registration meeting with the Ministry of Environment has been held and an Environmental Impact Study for the outfall has been initiated. It is planned to increase the permitted discharge to 46,000 m^3/day when registering under the MSR.

3.2 Municipal Sewage Regulation

Treatment and discharge of treated wastewater in British Columbia is governed by the Municipal Sewage Regulation (MSR) under the Environmental Management Act. The MSR was enacted in 1999. Facilities that had a valid discharge permit when the MSR was enacted are allowed to continue to operate under that permit. However, if a major permit amendment is requested (e.g., an increase in maximum day discharge of 20% of more), the MOE typically requires the permittee to register the discharge under the MSR, at which time the permit is cancelled. Registration under the MSR requires that an Environmental Impact Study of the plant discharge and a facility Operating Plan be prepared.

The effluent criteria for discharges of treated wastewater to open marine waters (based on the MSR) are summarized in Table 3-1.

TABLE 3-1
MSR EFFLUENT REQUIREMENTS FOR DISCHARGES TO OPEN MARINE WATERS WITH FLOW >50 m^3/day

Portion of Effluent Being Discharged	Discharge Standard	Parameter
Treatment requirement for daily flows up to 2.0 times ADWF [1]	Secondary	
Effluent Quality for daily flows up to 2.0 times ADWF [1]	45	BOD_5, mg/L
	45	TSS, mg/L
	6.0-9.0	pH
	[2, 3]	Disinfection, Coliforms
	—	Total phosphorus (P), mg/L
	—	Ortho phosphate as (P), mg/L
	[4]	Ammonia
Interim Treatment requirement for daily flows greater than 2.0 times ADWF [1]	Primary	
Interim Effluent quality for daily flows greater than 2.0 times ADWF [1]	130	BOD_5, mg/L
	130	TSS, mg/L
	[2, 3]	Disinfection, Coliforms
	[4]	Ammonia

1 Treatment and effluent quality requirements are determined by daily flow multiples which require secondary treatment for all flows up to and equaling 2.0 times the ADWF. As set out in condition 17 to Schedule 1, a liquid waste management plan or specific study and implemented measures are required if flows exceed 2.0 times ADWF during a storm or equivalent snowmelt event with a less than 5-year return period. In the interim, if flows exceed 2.0 times ADWF, a lesser standard of treatment may be allowed for existing discharges, but must not be less than primary. For areas of the province where permafrost or freezing ground conditions require, in accordance with a practice approved by the local building inspector or equivalent, connection of roof drains to the sanitary sewer system, a director may, in writing, increase the factor from 2.0 times to a maximum of 3.0 times.

2 The allowable number of fecal coliform organisms in the effluent is dependent on the use of the receiving water. For discharges to shellfish bearing waters the number of fecal coliform organisms outside the initial dilution zone must be less than 14/100 mL ("the median number of fecal coliform organisms in a water sample does not exceed 14/100 mL, with not more than 10% of the samples exceeding 43/100 mL", from "Canadian Shellfish Sanitation Program, Manual of Operations"). For discharges to recreational use waters the number of fecal coliform organisms outside the initial dilution zone must be less than 200/100 mL. Where domestic water extraction occurs within 300 meters of a discharge the median number of fecal coliform organisms must be less than 2.2/100 mL in the effluent with no sample exceeding 14/100 mL. The geometric mean, as determined from the bacteriological results of the last 5 samples for which analyses have been completed over the last 30 days, must not exceed the coliform limits specified, and for this purpose, "geometric mean" means the anti-logarithm of a calculation in which the logarithms of a series of numerical measures are summed and divided by the number of numerical measures.

3 If required to satisfy section 8 of the MSR

4 The maximum allowable effluent ammonia concentration at the "end of pipe" must be determined from a back calculation from the edge of the initial dilution zone. The back calculation must consider the ambient temperature and pH characteristics of the receiving water and known water quality guidelines.

The MSR sets out design standards for sewage treatment facilities. When discharging to open marine waters, such facilities must be designed to achieve the effluent quality standards described in Table 3-1. Environmental Impact Studies (EIS) are required for

facility siting, and reliability categories must be determined based on the results of the EIS. Three reliability categories are defined in the MSR as follows:

(a) Category I – Treatment works for reclaimed water or that discharge to waters or land that could be permanently or unacceptably damaged by effluent that is degraded in quality for even a few hours (for example, discharges near drinking water sources, shellfish waters or waters used for contact sports where "shellfish waters" means water bodies that have or could have sufficient shellfish quantities that recreational or commercial harvesting would take place or water for which commercial shellfish leases have been issued);

(b) Category II – Treatment works that discharge to waters or land that would not be permanently or unacceptably damaged by short term effluent degradation, but would be damaged by continued (several days) effluent quality degradation (for example discharges to recreational land and waters); and

(c) Category III – Treatment works not otherwise designated as Category I or II.

Equipment and process reliability criteria for the three categories set out in the MSR are summarized in Table 3-2.

TABLE 3-2
EQUIPMENT AND PROCESS RELIABILITY CATEGORY FOR TREATMENT FACILITIES

Component	Reliability Category					
	I		II		III	
	Treatment System	Power Source	Treatment System	Power Source	Treatment System	Power Source
Holding basin	Adequate capacity for all flows		Not applicable		Not applicable	
Degritting		Optional		No		No
Primary Sedimentation	Multiple units[a]	Yes	Same as Category I	Yes	Two minimum	Yes
Trickling filters	Multiple units[b]	Yes	Same as Category I	Optional	No backup	No
Aeration basins	Multiple units[b]	Yes	Same as Category I	Optional	Single unit permissible	No
Blowers or mechanical aerators	Multiple units[c]	Yes	Same as Category I	Optional	Two minimum[c]	No
Diffusers	Multiple sections		Same as Category I		Same as Category I	
Final sedimentation	Multiple units[b]	Yes	Multiple units[a]	Optional	Two minimum[a]	No
Chemical flash mixer	Two minimum or backup[e]	Optional	No backup	Optional	Same as Category II	No
Chemical sedimentation	Multiple units[b]	Optional	No backup	Optional	Same as Category II	No
Flocculation	Two minimum[a]	Optional	No backup	Optional	Same as Category II	No
Effluent filters	Two minimum[b]	Yes	Same as Category I	Yes	Same as Category I	Yes
Disinfection basins	Multiple units[b]	Yes	Multiple units[a]	Yes	Same as Category II	No
Aerobic digesters	Two minimum[a]	Yes	Same as Category I	Optional	Single unit	No
Anaerobic digesters	Two minimum[a]	Yes	Same as Category I	Optional	Two Minimum	No
Facultative lagoons	Two cells[b]		Two cells		Two cells	
Aerated lagoons	Two cells[b]	Yes	Two cells	Optional	Two cells	No
Package treatment plants	Multiple units[b,f] or ability to repair within 48 hours	Yes	Two units or ability to repair single unit within 48 hours	Yes	Single unit may be permissible	No

[a] Remaining capacity with largest unit out of service must be for at least 50% of the design maximum flow.
[b] Remaining capacity with largest unit out of service must be for at least 75% of the design maximum flow.
[c] Remaining capacity with largest unit out of service must be able to achieve design maximum oxygen transfer; backup unit need not be installed.
[d] Maximum oxygen transfer capability must not be measurably impaired with largest section out of service.
[e] If only one basin, backup system must be provided with at least 2 mixing devices (one may be installed).
[f] Effluent filtration is required in conjunction with ground disposal.

As shown in Table 3-2, the treatment process requirements for several components are the same for Categories I and II; however, an independent power source (i.e., genset) is required for all process components in Category II. Other differences are that the redundancy requirements are greater for final sedimentation and disinfection basins for a Category I plant than for Category II.

4.0 DESCRIPTION OF FACILITIES

Figure 4-1 shows the existing site layout at the CVWPCC, and Figure 4-2 shows a Process Flow Diagram of the treatment facilities. Below is a summary of each of the major process components.

4.1 Headworks

Wastewater enters the facility via an 850 mm diameter pipe from Comox and Courtney, and a 350 mm diameter pipe from CFB Comox.

The raw wastewater is screened by two automatically raked bar screens. The screens have bar spacing of 12 mm and are mounted in 1.5 m wide channels. The screens each have a maximum capacity of 526 L/s and operate in duty/assist configuration, as dictated by influent flows. Plant staff are considering replacing the existing screens with 6 mm screens in 2009 to improve removal of trash and debris.

4.2 Pre-aeration Grit Tanks

The screened influent flows into three grit removal tanks. The grit tanks have a volume of 81.3 m^3 each. Each grit tank is integral with a primary sedimentation tank (see below).

Plant staff estimate that 60% of the influent grit is removed in the grit tanks.

4.3 Primary Sedimentation Tanks

Primary sedimentation is achieved through 3 tanks. The tanks are each 32.65 m long, 6.1 m wide and 3.6 m deep. The primary tanks were originally designed for co-settling of primary solids and waste activated sludge (WAS); however, the process has been changed and WAS is now routed to separate mechanical thickeners (see Section 4.8 below).

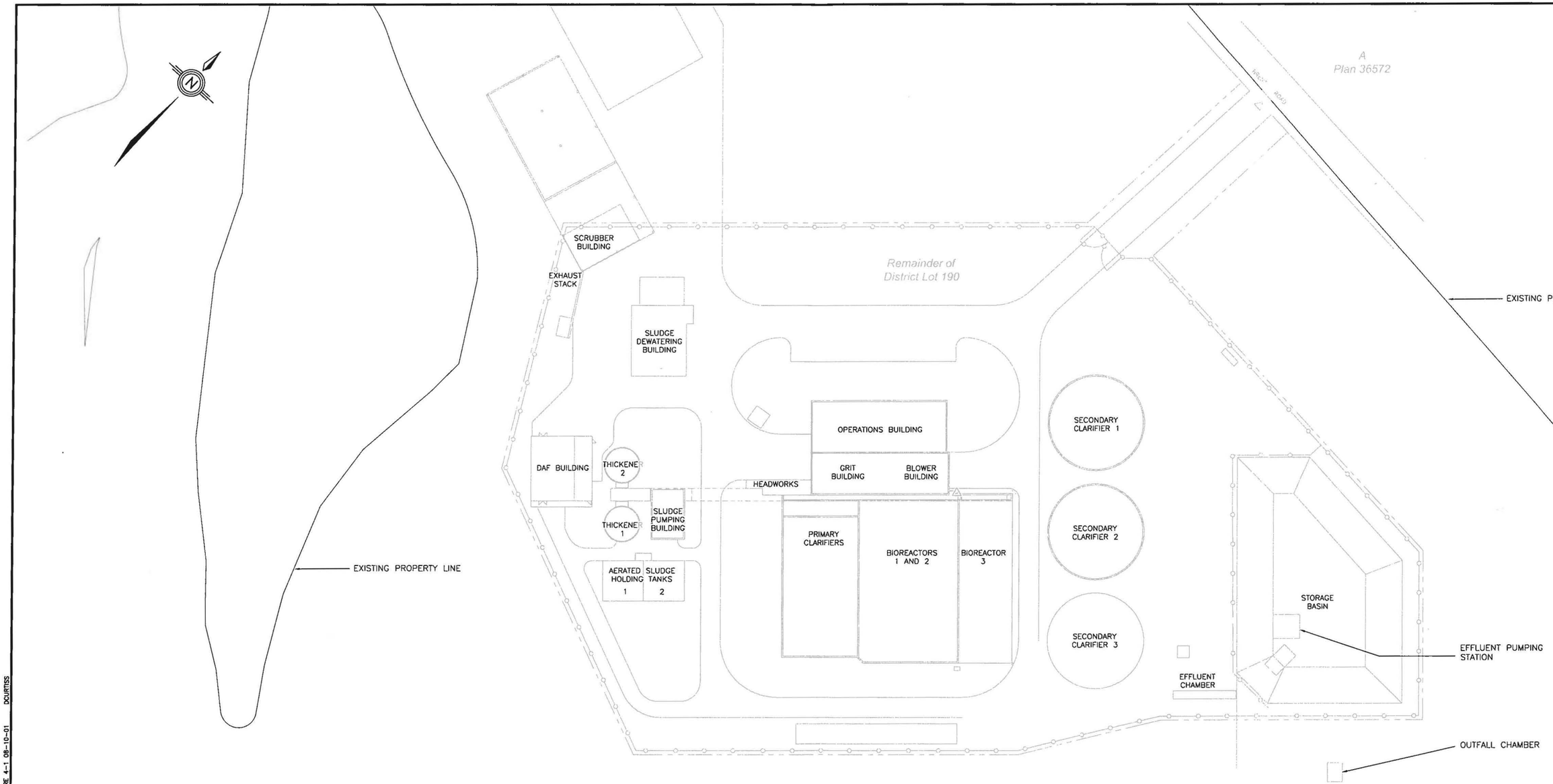
Primary sludge is drawn off continuously from the bottom of the sedimentation tanks at low solids concentration and is pumped through a grit removal cyclone. Plant staff estimate that the remaining 40% of the influent grit load passing the grit tanks is removed by the cyclones.

4.4 Secondary Treatment

Secondary treatment is achieved by a plug flow activated sludge process. There are three aeration tanks and three secondary clarifiers. In the recent upgrade, the third aeration tank and secondary clarifier were installed. These units were commissioned in January 2008.

The original two aeration tanks are 1,460 m^3 each, while the new tank is 1,539 m^3. The total aeration volume is 4459 m^3. The average MLVSS in the reactor during 2007 was 2,300 mg/L and the return activated sludge (RAS) recycle rate was approximately 40% of the plant influent flow rate. Waste activated sludge (WAS) is taken directly from the aeration tanks, rather than from the secondary clarifier underflow.

The three secondary clarifiers are all 23.17 m diameter.



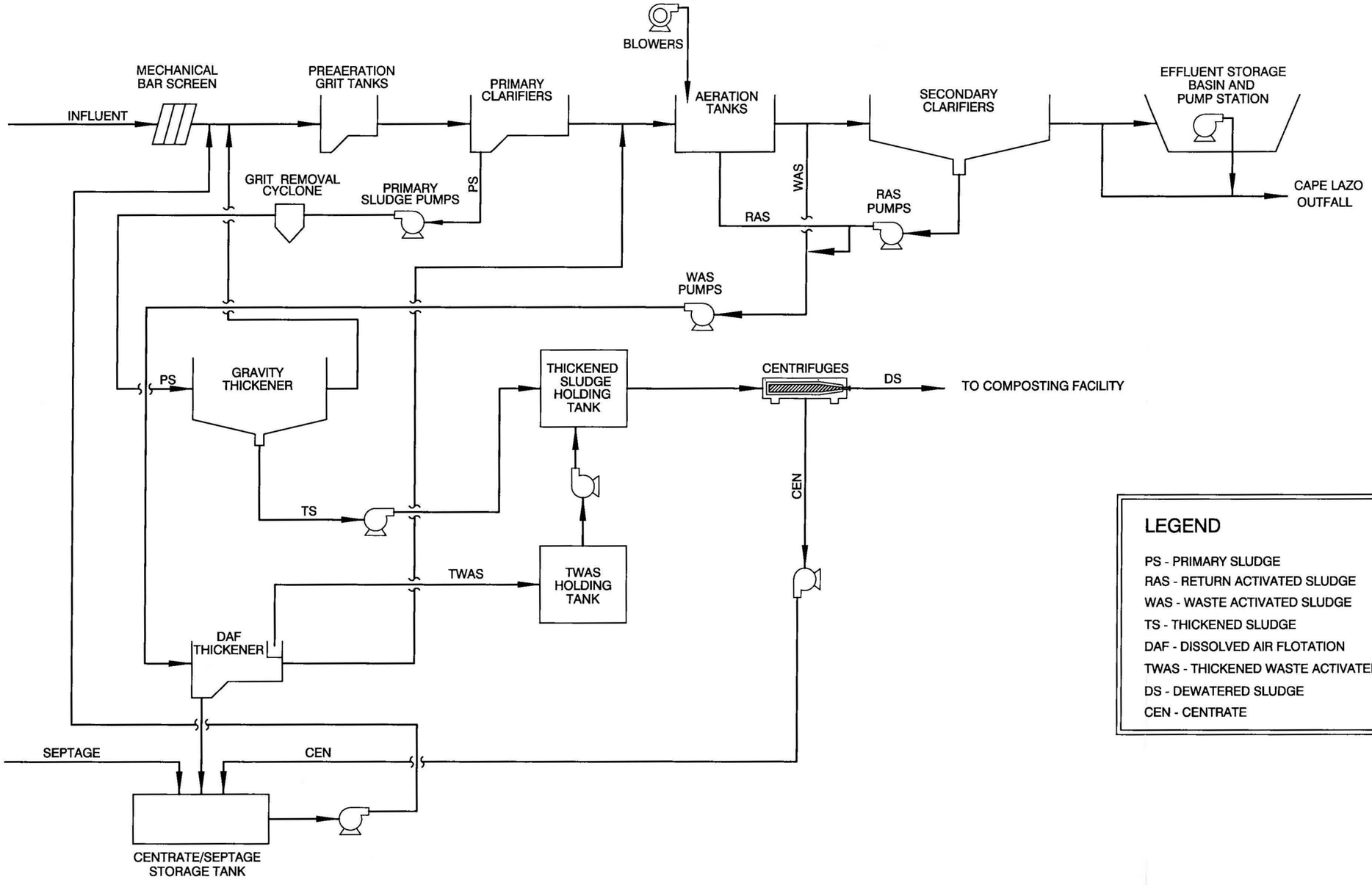
COMOX VALLEY WATER POLLUTION CONTROL CENTRE
EXISTING SITE LAYOUT

FILE: P:\PRODWGS\MacELHANNEY\327-3\FIGURES\327-3 FIGURE 4-1.dwg Tab FIGURE 4-1 08-10-01 DCURTISS

PLOT: FULL 1:1 HALF 1:2

Dayton & Knight Ltd.
CONSULTING ENGINEERS
DRAWN BY: RB
DWG. No. 327.3

FIGURE 4-1



LEGEND

PS - PRIMARY SLUDGE
RAS - RETURN ACTIVATED SLUDGE
WAS - WASTE ACTIVATED SLUDGE
TS - THICKENED SLUDGE
DAF - DISSOLVED AIR FLOTATION
TWAS - THICKENED WASTE ACTIVATED SLUDGE
DS - DEWATERED SLUDGE
CEN - CENTRATE

COMOX VALLEY WATER POLLUTION CONTROL CENTRE
PROCESS FLOW DIAGRAM

PLOT: FULL 1:1 HALF 1:2

Dayton & Knight Ltd.
CONSULTING ENGINEERS
DRAWN BY: EP
DWG. No. 327-3

FIGURE 4-2

4.5 Effluent Storage Basin and Effluent Pump Station

Overflow from the secondary clarifiers enters a weir box, where it either flows directly to the outfall or into the effluent storage basin. During the most recent upgrade, an effluent pump station was installed in the storage basin. The pump station has three pumps, and a capacity of 60 ML/d to 65 ML/d (Earthtech construction drawings, Secondary Treatment Expansion Project, May 2007).

4.6 Outfall

The Cape Lazo outfall extends out into the Straight of Georgia, and discharges at a depth of 60 m. A review of the outfall by Komex (2001) gave the capacity of the outfall as 41,000 m^3/d at high high water (HHW) and a limiting head of 5.83 m at the facility. With the new effluent pump station in operation the outfall capacity has been increased to 60 ML/d to 65 ML/d (Earthtech construction drawings, Secondary Treatment Expansion Project, May 2007).

4.7 Gravity Thickener

Primary sludge pumped from the sedimentation tanks is thickened in two circular gravity thickeners, each with a diameter of 7.3 m.

4.8 Dissolved Air Flotation (DAF) Thickener

The dissolved air floatation (DAF) thickener was installed in 2003 to thicken the WAS removed from the aeration basins. There is a single DAF unit, with an average flow capacity of 46 m^3/h and a maximum capacity of 65 m^3/h. Underflow from the DAF is returned to the liquid process upstream of the secondary aeration basins.

4.9 Sludge Holding Tanks

Thickened primary sludge and thickened WAS (TWAS) are discharged to two separate storage tanks. Thickened primary sludge is discharged directly to the thickened sludge holding tank, while TWAS is discharged to the TWAS holding tank, then pumped into the thickened sludge holding tank to be mixed with the primary sludge. The tanks are not aerated, but are mixed. Each tank has a volume of 330 m^3.

4.10 Centrifuges

In 2005 two centrifuges were installed for sludge dewatering. Each centrifuge has a capacity of 36 m^3/h at an input solids concentration of 4% total solids by weight. The centrifuges achieve a solids content of 25% by weight on average.

The centrifuges operate in duty/standby configuration. Centrate is discharged to the centrate/septage storage tank, which is then pumped to the liquid process ahead of the grit removal tanks.

4.11 Composting Facility

Dewatered sludge is trucked to the Regional compost facility. Assessment of the composting facility is outside the scope of this study.

4.12 Septage

Septage is received at the facility and is discharged to the centrate/septage storage tank. The mix is then discharged to the liquid process upstream of the grit tanks.

5.0 PERFORMANCE

Data from January 2003 to July 2008 were analysed to assess the level of compliance with the discharge Permit. During the period of record, the facility was frequently out of compliance with the limits imposed by the permit. Figure 5-1 shows the number of permit exceedences for flow TSS and BOD for 2003 to July 2008. Most frequently the flow was exceeded, while TSS and BOD limits were exceeded less frequently.

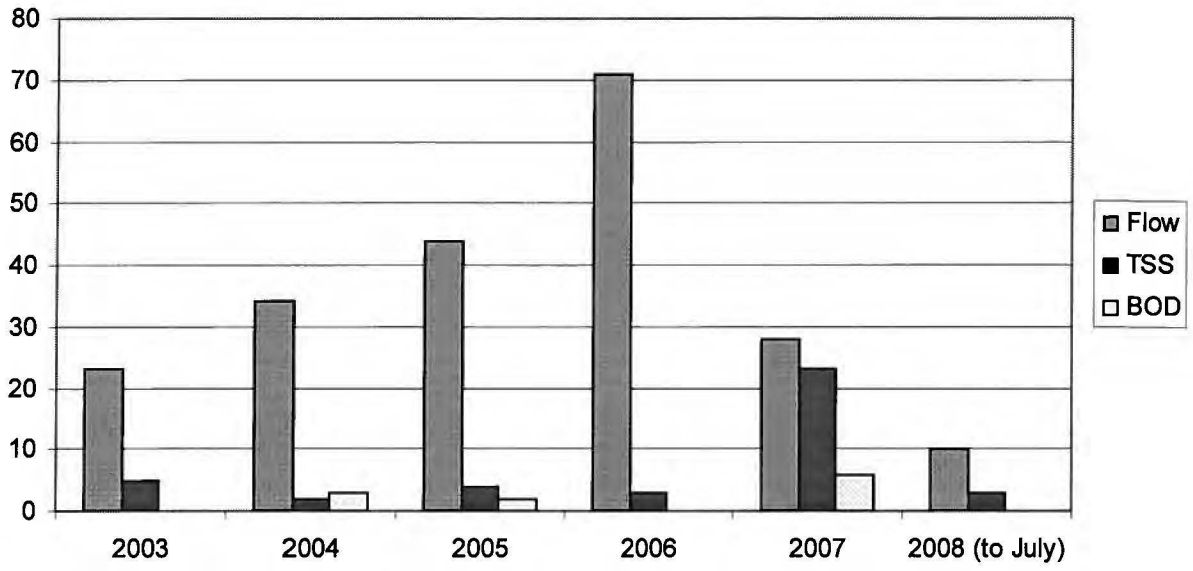


Figure 5-1 Number of Permit Exceedences

Note: No effluent BOD data was available from 2008.

As discussed earlier, the facility is working towards registration under the MSR. While this will address the issue of flow exceedences (by increasing the allowable daily discharge), effluent TSS and BOD concentrations will not be addressed by registration under the MSR; note that the MSR imposes a limit of 45 mg/L for TSS, rather than 60 mg/L as in the current Permit.

As shown in Figures 5-2, 5-3 and 5-4, the permit exceedences generally appear to coincide with high flow periods, and are likely due to washout of solids from the secondary clarifiers. Plant staff report that, since the recent commissioning of the third secondary clarifier, plant effluent TSS concentrations have been consistently well below 45 mg/L.

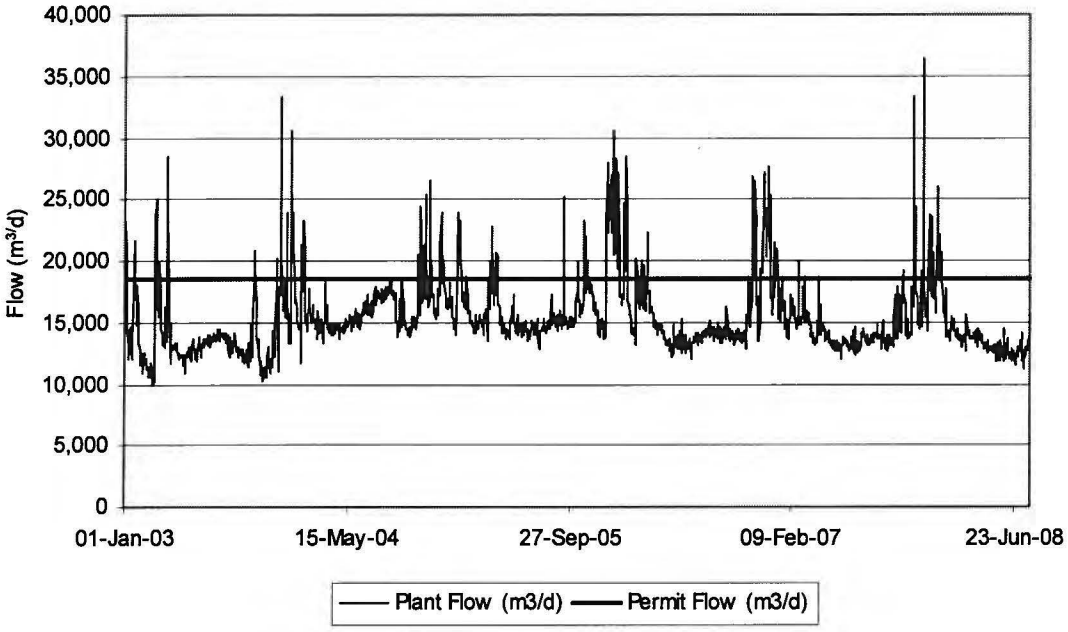


Figure 5-2 Effluent Flow

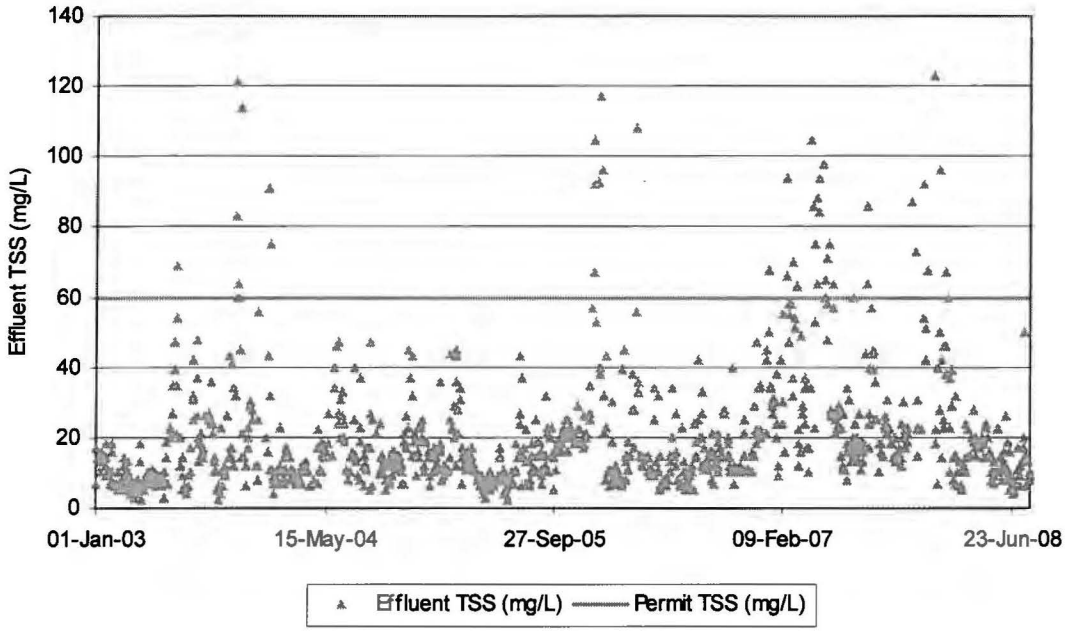


Figure 5-3 Effluent TSS

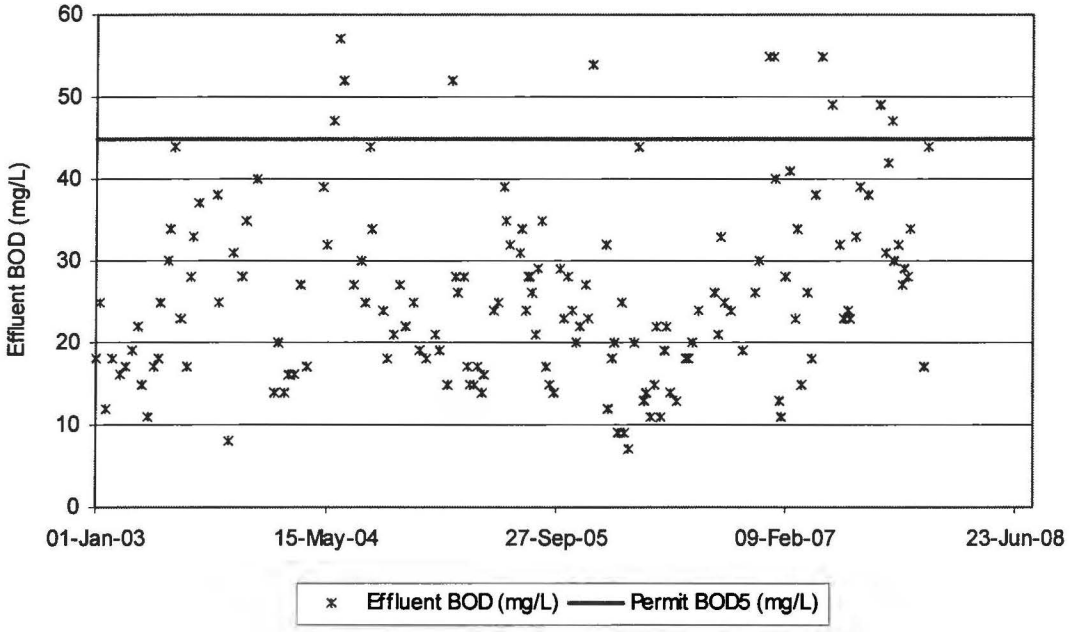


Figure 5-4 Effluent BOD

Note: no effluent BOD data from 2008 was available.

The analysis in Section 6 of this Memorandum shows that the secondary process has sufficient capacity to treat current flows and loads, and solids should not be washing out even at peak flows. Operating data from 2003 to 2008 were analyzed to determine what may be causing the permit violations. Key operating parameters from the data record (2003 to 2007) are compared with recommended values from Metcalf & Eddy (2003) in Table 5-1. As shown, all parameters were well within the recommended ranges, except for the sludge volume index (SVI). The SVI is a commonly used measure of how well the biological solids from the activated sludge aeration tanks settle in the secondary clarifiers, with values of less than 150 mL/g being preferred.

TABLE 5-1
SECONDARY ACTIVATED SLUDGE PROCESS CRITERIA

Parameter	Average from Historical Data	Recommended Range
MLSS (mg/L)	2,554 [1]	1,000 – 3,000
MLVSS (mg/L)	2,302 [1]	
Recycle Rate	40%	25% – 75%
F/M ratio	0.32	0.2 – 0.4
SRT (d)	8 [2]	3 – 15
SVI	234	< 100 preferred, > 150 may indicate sludge bulking issues

[1] Averages from 2007 only.

[2] Average since secondary process upgrade commissioning (January 2008).

As shown on Figure 5-5, the SVI at the CVWPCC during the period of record was consistently well above the recommended level of about 150 mL/g, and frequently ranged to values well above 300 mL/g, indicating that the process biological solids have poor settling qualities. Poorly settling sludge, or *bulking sludge*, may be caused by growth of nuisance filamentous organisms. Plant staff note that filamentous growth has previously been a problem at the facility but is not currently reported to be present. A chlorine injection system for the RAS is in place and has been found to be effective at removing filamentous growth. While filamentous growth may not currently be a problem, the biological solids continue to be have poor settling qualities. As the

hydraulic load on the secondary clarifiers increases, this may result in sludge wash out or permit exceedances. The cause of the poor settling characteristics should be investigated.

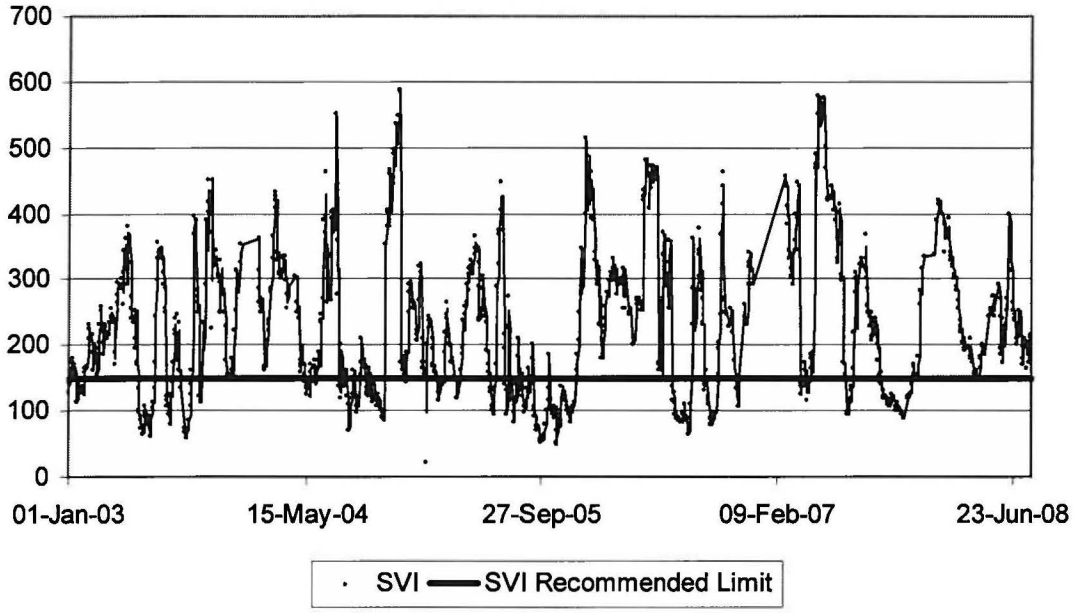


Figure 5-5 Sludge Volume Index (SVI)

6.0 CAPACITY ASSESSMENT

The capacity of each unit process at the CVPCC is assessed below. The existing flow or load to each unit process is expressed as a percentage of the total capacity of the existing facilities, and a corresponding maximum population is shown (based on per capita flows and loads as developed earlier in this Memorandum).

6.1 Headworks

The screens have a peak capacity of 562 L/s each, or 1,124 L/s total. Current peak flows are only 52% of the peak capacity. The existing screens could service an estimated population of up to 71,000 people based on current per capita flows.

The MSR has no redundancy requirements for primary screening.

6.2 Pre-aeration Grit Tanks

The capacity of the grit removal tank is based on hydraulic retention time (HRT). Metcalf & Eddy (2003) gives a range of HRT for design of 2-5 minutes at peak flow. For this assessment, an HRT of three minutes was selected as the design HRT.

The capacity of each of the tanks is 39 ML/d assuming an HRT of 3 minutes, giving a total capacity of 117 ML/d. The current peak flow to the plant is 40% of this; the grit tanks could therefore service a population of up to 91,000 people.

The MSR has no redundancy requirements for grit removal.

6.3 Primary Sedimentation Tanks

The criteria given in Table 6-1 taken from (Metcalf & Eddy, 2003) are commonly used to design primary sedimentation tanks. For this assessment, the typical values shown in Table 6-1 were used.

TABLE 6-1
PRIMARY SEDIMENTATION TANK DESIGN CRITERIA

Criteria	Range	Typical
Detention time at avg. flow (hr)	1.5 - 2.5	2
Average overflow rate ($m^3/m^2/d$)	30 - 50	40
Peak overflow rate (m^3/m2/d)	80 - 122	100

The MSR requires that for primary sedimentation tanks the remaining capacity with the largest unit out of service must be able to handle at least 50% of the design maximum flow. Table 6-2 compares the installed capacity of the primary tanks (according to solids loading and overflow rate) to the current actual loading. The right half of the table gives the capacity and loading with the largest unit out of service as specified under the MSR redundancy requirements.

TABLE 6-2
PRIMARY CLARIFICATION INSTALLED CAPACITY AND CURRENT LOADING

Criteria	All Units in Service				Largest Unit Out of Service			
	Available Capacity		Current Flow		Available Capacity		50% of Current Flow	
	Average	Peak	Average	Peak	Average	Peak	Average	Peak
Detention Time (ML/d)	25.8	-	15.5	-	17.2	-	7.7	-
Overflow rate (ML/d)	23.9	59.7	15.5	46.9	15.9	39.8	7.7	23.5

Table 6-3 presents the current loading as a percent of the available installed capacity; as shown for the most critical design parameter (peak overflow rate), the primary sedimentation tanks are operating at 79% of their available capacity; the primary sedimentation tanks could therefore service a population of up to 46,000 people based on total capacity with all units in service.

TABLE 6-3
PRIMARY TANK CURRENT LOADING AS % OF INSTALLED CAPACITY

Criteria	All Units in Service		Largest Unit Out of Service, 50% of Current Flow	
	Average	Peak	Average	Peak
Detention Time	60%	-	45%	-
Overflow rate	65%	79%	49%	59%

6.4 Secondary Treatment

6.4.1 Aeration Basins

The criteria shown in the left-hand side of Table 6-4 (from Metcalf & Eddy, 2003), are commonly used to size aeration basins for conventional plug flow activated sludge processes. The current maximum month loading using to the existing aeration basins is shown in the third column of Table 6-4. As shown, the aeration tanks are operating within the recommended range with all tanks in service. With the largest unit out of service and at 100% of the current maximum month flow and load, the two remaining tanks would be loaded in excess of the recommended range for both HRT and BOD_5 mass load.

The current maximum month flow and load to the existing aeration tanks and the recommended design parameters from Table 6-4 were used to assess the ultimate capacity of ht existing aeration tanks. The analysis showed that with all units in service, the existing tanks are receiving about 80% of the recommended maximum allowable load for both HRT and BOD_5 volumetric loading. The MSR requires that the remaining capacity with the largest unit out of service must be for at least 75% of the design maximum flow; the existing tanks meet this requirement for both TSS and volumetric BOD_5 load, but will not continue to do so if plant flow and/or BOD_5 load increase by more than about 10%.

TABLE 6-4
CAPACITY OF EXISTING AERATION TANKS

Parameter	Recommended Range[1]	Current Maximum Month Flow/Load	
		All units in Service[2]	Largest Unit out of Service[3]
Volumetric BOD_5 Load (kg $BOD/m^3/d$)	0.3 to 0.7	0.54	0.62
Hydraulic Retention Time (hours)	4 to 8	5.1	4.4

1 from Metcalf & Eddy, 2003
2 at maximum month flow and load
3 assumes 75% of maximum month flow and load.

Based on the above analysis, the activated sludge aeration tanks could service a population of about 45,000 people based on total capacity, or 40,000 if the MSR redundancy requirements are to be met.

6.4.2 Secondary Clarifiers

The criteria given in Table 6-5 (from Metcalf & Eddy, 2003), are commonly used to size secondary clarifiers for air-activated sludge processes.

TABLE 6-5
DESIGN CRITERIA FOR SECONDARY CLARIFICATION FOLLOWING AIR-ACTIVATED SLUDGE

Criteria	Average	Peak
Solids Loading ($kg/m^2/h$)	4 to 6	8
Overflow rate ($m^3/m^2/d$)	16 to 28	40 to 64

The MSR requires that the remaining capacity with the largest unit out of service must be for at least 75% of the design maximum flow. Table 6-6 compares the installed capacity of the secondary clarifiers (according to solids loading and overflow rate) to the current actual loading. The right part of the table gives the capacity and loading based on the

mid-range values from Table 6-5 with the largest unit out of service as specified the MSR redundancy requirements. Table 6-7 presents the current loading as a percentage of the available installed capacity. For calculation of solids loading, a recycle rate of 40% and an MLSS of 2,554 mg/L were used (these are the average recorded values from 2007).

TABLE 6-6
SECONDARY AERATION BASIN INSTALLED CAPACITY AND CURRENT LOADING

Criteria	All Units in Service				Largest Unit Out of Service			
	Available Capacity		Current Flow/Load		Available Capacity		75% of Current Flow/Load	
	Average	Peak	Average	Peak	Average	Peak	Average	Peak
Solids Loading (kg/d)	151,790	242,865	55,387	167,871	101,194	161,910	41,540	125,903
Overflow rate (ML/d)	27.8	65.8	15.5	46.9	18.6	43.9	11.6	35.2

TABLE 6-7
SECONDARY CLARIFIER CURRENT LOADING AS PERCENTAGE OF INSTALLED CAPACITY

	All Units in Service[1]		Largest Unit Out of Service[2]	
Criteria	Average	Peak	Average	Peak
Solids Loading (kg/d)	36%	69%	41%	78%
Overflow rate (ML/d)	56%	71%	63%	80%

1 based on current plant flows and loads
2 at 75% of current plant flows and loads

As shown in Table 6-7, under the most critical design parameter (peak overflow rate, when applying the MSR redundancy requirements), the secondary clarifiers are operating at 80% of their available capacity; the secondary clarifier tanks could therefore service a population of up to 45,000 people when applying the redundancy requirements of the MSR. Based on total capacity with all units in service, the clarifiers could handle a population of about 50,000 people.

6.5 Effluent Storage Basin, Effluent Pump Station and Outfall

The effluent pump station and outfall has a capacity of 60 ML/d to 65 ML/d. The current PWWF is approximately 46.9 ML/d, or about 78% of total capacity. The effluent pump station could therefore service a population of about 47,000 people. However, this does not take into account the buffering provided by the effluent storage basin and tidal effects. A detailed analysis of tide levels, effluent flow and storage capacity would be required to ascertain the ultimate capacity of the effluent pump station.

6.6 Gravity Thickener

The criteria given in Table 6-8 (from Metcalf & Eddy, 2003), are commonly used to size primary sludge gravity thickeners. Typically gravity thickeners are used to thicken primary sludge that has already been particularly thickened in the primary settling tanks to around 2% to 6% solids (Metcalf and Eddy, 2003). However, at the CVWPCC, the primary sludge taken from the settling tanks is relatively thin (about 0.12% solids) to allow for proper operation of the grit removal cyclones. This thin sludge results in a high hydraulic load and low solids load on the gravity thickeners. The gravity thickeners appear to be working well at the high hydraulic load, so the maximum overflow rate used to assess the capacity was at the high end of the range in Table 6-8.

TABLE 6-8
DESIGN CRITERIA FOR PRIMARY SLUDGE GRAVITY THICKENING

Criteria	Recommended Range
Solids Loading ($kg/m^2/d$)	100 to 150
Maximum overflow ($m^3/m^2/d$)	15.5 to 31

The MSR has no redundancy requirements for sludge thickening. Table 6-9 compares the installed capacity of the gravity thickeners (according to solids loading and overflow rate)

to the current actual loading; the current loading as a percentage of the available installed capacity is included.

TABLE 6-9
GRAVITY THICKENER INSTALLED CAPACITY AND CURRENT LOADING

Criteria	Available Capacity	Current Flow	Current Load as % of Capacity
Solids Loading (kg/d)	10,463	2,494	24%
Overflow rate (m^3/d)	2,595	2,607	100%

As shown, the gravity thickeners are currently loaded to their full hydraulic capacity. However, plant staff indicate that the gravity thickeners are still performing well at this loading (see earlier discussion). The gravity thickeners may continue to perform well as loading increases. However, for the purposes of this study, it was assumed that the gravity thickeners are at capacity based on hydraulic load.

6.7 DAF Thickener

The DAF unit has an average flow capacity of 46 m^3/h and a maximum capacity of 65 m^3/h. Table 6-10 shows the DAF capacity and current WAS flows. The current average and peak WAS flows are 55% of the respective capacities of the DAF unit. The DAF unit could therefore service a population of up to 66,000 people. The MSR has no redundancy requirements for WAS thickening.

TABLE 6-10
DAF CAPACITY AND CURRENT WAS FLOW TO THE DAF

Criteria	Available Capacity		Current Flow		Current Load as % of Capacity	
	Average	Peak	Average	Peak	Average	Peak
Flow (m^3/d)	46	65	25	36	55%	55%

6.8 Centrifuges

The centrifuges each have a capacity of 36 m^3/h with a input solids concentration of 4%. Table 6-11 shows the current feed rate of the centrifuges, and the hours each day that both centrifuges must be run for. The table also shows the current loading as a percent of the total capacity, assuming the centrifuges can be run for a maximum of 7 hours a day, 5 days a week. The centrifuges have sufficient capacity to meet current loading. As the loading increases, the centrifuge run hours can be increased. The ultimate population assuming the centrifuges are both run 7 hours a day, 5 days a week is 96,000 people. However, this does not allow for one centrifuge to be out of operation. With one centrifuge out of operation, the design capacity is 48,000 people, unless shift work outside normal working hours is undertaken.

TABLE 6-11
CENTRIFUGE CAPACITY

	Average	Max month
Centrifuge Feed Rate (m^3/d)	130	191
Operating hours per day (for two centrifuges)	1.8	2.7
Current Loading as % of Capacity	26%	38%

6.9 Summary

Table 6-12 shows the current loading on each process unit as a percentage of the installed capacity. For each process, the flow or load parameter that was the most critical was used. Also given is the population that each unit process could service before upgrades are required, taking into account both total process capacity and the redundancy requirements of the MSR, whichever is the governing factor.

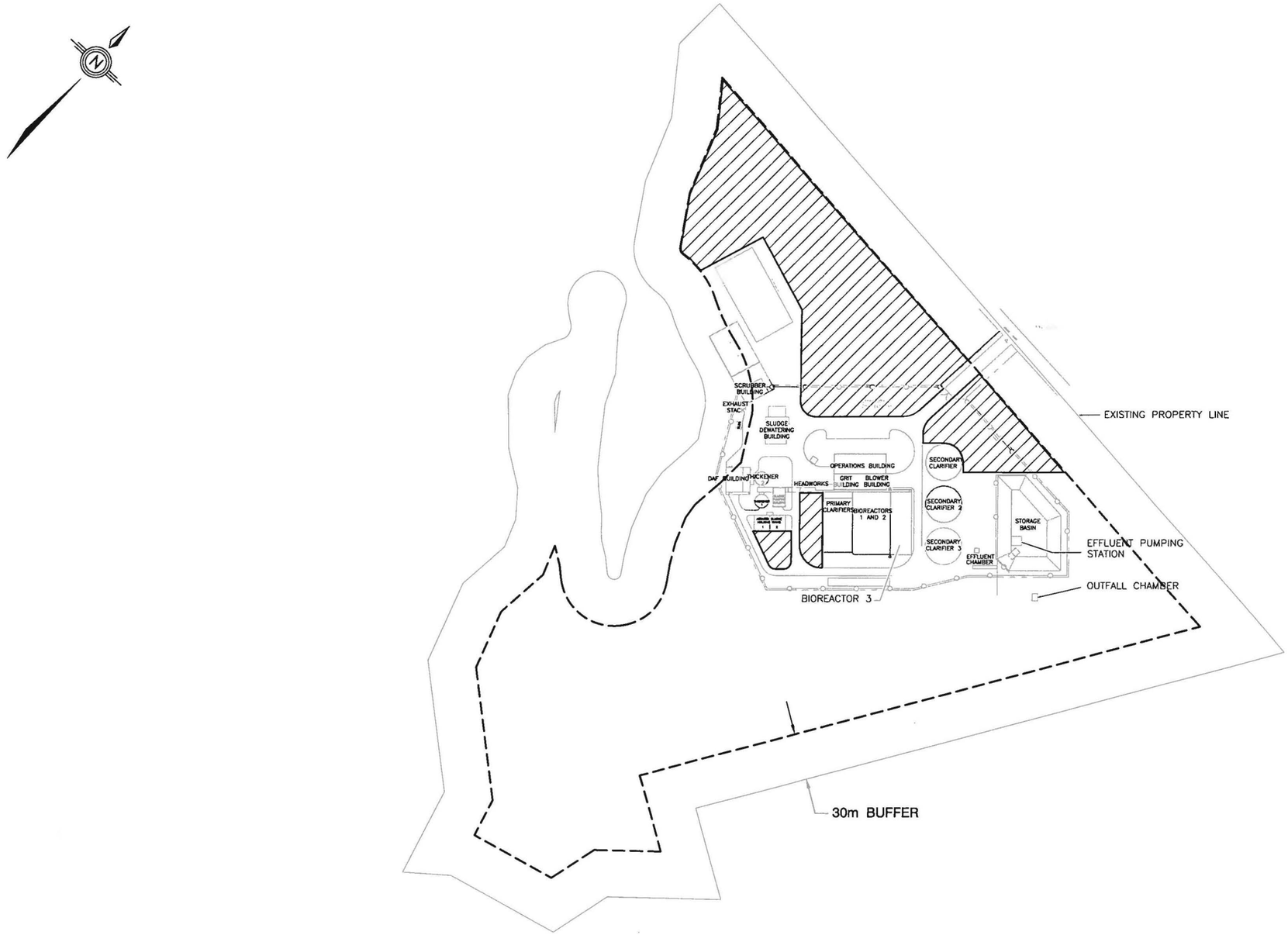
TABLE 6-12
LOADING ON EXISTING PROCESSES AND POTENTIAL SERVICE POPULATION

Process	Current Flow/Load as % of Installed Capacity	Installed Service Population
Mechanical Bar Screens	52%	71,000
Grit Removal Tanks	40%	91,000
Primary Sedimentation Tanks	79%	46,000
Aeration Basins	90%	40,000
Secondary Clarifiers	80%	45,000
Effluent Pump Station and Outfall	78%	47,000
Gravity Thickeners	100%	36,000
DAF Thickener	55%	66,000
Centrifuge Dewatering	38%	96,000

7.0 SITE EXPANSION

The preferred area for site expansion is shown on Figure 7-1 is. While a large area of land is available along the south-western side of the property, expansion into this area is not favoured due to the proximity of residences along this boundary and the potential for odour complaints.

Using the same processes as are existing on the site, there is sufficient land available to easily double the existing treatment capacity. Use of more space efficient technology, or expansion to the south-west (with improved odour control) would allow further expansion of capacity at the site. It can be concluded that availability of land at the treatment plant site will not be a limiting factor in expansion of treatment capacity for the foreseeable future. A more detailed evaluation of plant site capacity and ultimate service population will be developed in Activity 3.



COMOX VALLEY WATER POLLUTION CONTROL CENTRE
PREFERRED EXPANSION AREA

FIGURE 7-1

PLOT: FULL 1:1 HALF 1:2
Dayton & Knight Ltd.
CONSULTING ENGINEERS
DRAWN BY: RB
DWG. No. 327.3
FILE: P:\PRODWGS\McELHANNEY\327-3\FIGURES\327-3 FIGURE 7-1.dwg Tab FIGURE 7-1 08-10-01 DCURTISS

Comox Valley
REGIONAL DISTRICT

SEWAGE MASTER PLAN
COMOX VALLEY WATER POLLUTION CONTROL CENTRE
CAPACITY ASSESSMENT

APPENDIX A

DISCHARGE PERMIT PE-5856

MINISTRY OF ENVIRONMENT

PERMIT

Under the Provisions of the Waste Management Act

REGIONAL DISTRICT OF COMOX-STRATHCONA
P. O. Box 3370
Courtenay, British Columbia
V9N 5N5

is hereby authorized to discharge effluent from a municipal sewerage system located within the Regional District of Comox-Strathcona to Georgia Strait off Cape Lazo

This permit has been issued under the terms and conditions prescribed in the attached appendices 01, A-1, B-1, C-1, and C-2

L. E. Oldham
Regional Waste Manager
Permit No. PE-5856

Date issued: November 21, 1980
Date amended: August 17, 1981
JUL 23 1985

MINISTRY OF ENVIRONMENT

WASTE MANAGEMENT BRANCH

APPENDIX 01

to Permit No. PE-5856

(Effluent)

(a) The discharge of effluent to which this appendix is applicable is from a municipal sewerage system as shown on the attached Appendix A-1.

(b) The maximum rate at which effluent may be discharged is 18 500 m^3/d.

(c) The characteristics of the effluent shall be equivalent to or better than: 5-day biochemical oxygen demand 45 mg/L
total suspended solids 60 mg/L.

(d) The works authorized are screening, degritting and ancilliary facilities, secondary-type treatment plant, sludge digestion facilities and an outfall with diffuser terminating at a depth of 60 m below low water level and extending seaward off Cape Lazo approximately 2750 m from low water mark and related appurtenances approximately located as shown on the attached Appendix A-1.

(e) The location of the facilities from which the effluent originates and to which this appendix is appurtenant is Rem. D. L. 190, Comox District.

(f) The location of the point of discharge and to which this appendix is appurtenant is Georgia Strait off Cape Lazo.

(g) The works authorized must be complete and in operation on and from the date of this appendix.

Date issued: November 21, 1980

Date amended: August 17, 1981
JUL 23 1985

L. E. Oldham

Regional Waste Manager

MINISTRY OF ENVIRONMENT

WASTE MANAGEMENT BRANCH

APPENDIX B-1

to Permit No. PE-5856

A. MAINTENANCE OF WORKS

The Permittee shall inspect the pollution control works regularly and maintain them in good working order. Notify the Regional Waste Manager of any malfunction of these works.

B. EMERGENCY PROCEDURES

In the event of an emergency or condition beyond the control of the Permittee which prevents continuing operation of the approved method of pollution control, the Permittee shall immediately notify the Regional Waste Manager and take appropriate remedial action.

C. BYPASSES

The discharge of effluent which has bypassed the designated treatment works is prohibited unless the approval of the Director or the Regional Waste Manager is obtained and confirmed in writing.

D. PROCESS MODIFICATIONS

The Permittee shall notify the Regional Waste Manager prior to implementing changes to any process that may affect the quality and/or quantity of the discharge.

E. DISINFECTION

Although disinfection of the effluent is not required at this time, suitable provisions should be made to include disinfection facilities in the future. If disinfection is by chlorination, dechlorination facilities may also be required.

F. OUTFALL INSPECTION

The Permittee shall conduct a dye test on the outfall line (or inspect by another method approved by the Regional Waste Manager) once every five years or as may otherwise be required by the Regional Waste Manager.

Date issued: JUL 23 1985

Date amended: _____

_____

_____

L. E. Oldham

Regional Waste Manager

EAA 2000

MINISTRY OF ENVIRONMENT

WASTE MANAGEMENT BRANCH

APPENDIX C-1

to Permit No. PE-5856

I. DISCHARGE MONITORING

A. COMPOSITE SAMPLING

The Permittee shall install a suitable sampling facility and obtain a composite sample of the effluent once every month. The sample is to consist of four grab samples taken over a four-hour period at maximum flow and mixed to form a single sample for subsequent analysis. Proper care should be taken in sampling, storing and transporting the sample to adequately control temperature and avoid contamination, breakage, etc.

B. ANALYSIS

Obtain analysis of the sample for the following parameters:

5-day biochemical oxygen demand
Total suspended solids

Analyses are to be carried out in accordance with procedures described in the second edition (February, 1976) of "A Laboratory Manual for the Chemical Analysis of Waters, Wastewaters, Sediments and Biological Materials," or by suitable alternative procedures as approved by the Regional Waste Manager.

Copies of the above mentioned manual are available from the Environmental Laboratory, 3650 Wesbrook Crescent, Vancouver, British Columbia, V6S 2L2, at a cost of $10.00 and are also available for inspection at all Waste Management offices.

C. FLOW MEASUREMENT

Provide and maintain a suitable flow measuring device and record once per day the effluent volume discharged over a 24-hour period.

Date issued: JUL 23 1985

Date amended: _____

_____

_____

A. E. Oldham

Regional Waste Manager

MINISTRY OF ENVIRONMENT

WASTE MANAGEMENT BRANCH

APPENDIX C-2

to Permit No. PE-5856

D. REPORTING

Maintain data of analyses and flow recordings for inspection and annually submit the data, suitably tabulated, to the Regional Waste Manager. The first report is to be submitted by January 31, 1986.

II. RECEIVING ENVIRONMENT MONITORING

The Permittee shall complete the receiving environment monitoring program approved by letter dated January 8, 1982. The program includes collection and analysis of samples, tabulation and interpretation of the results and submission of a report to the Regional Waste Manager by December 31, 1985.

Date issued: JUL 23 1985

Date amended: _____

_____

_____

L E Oldham

Regional Waste Manager

ENV 2066

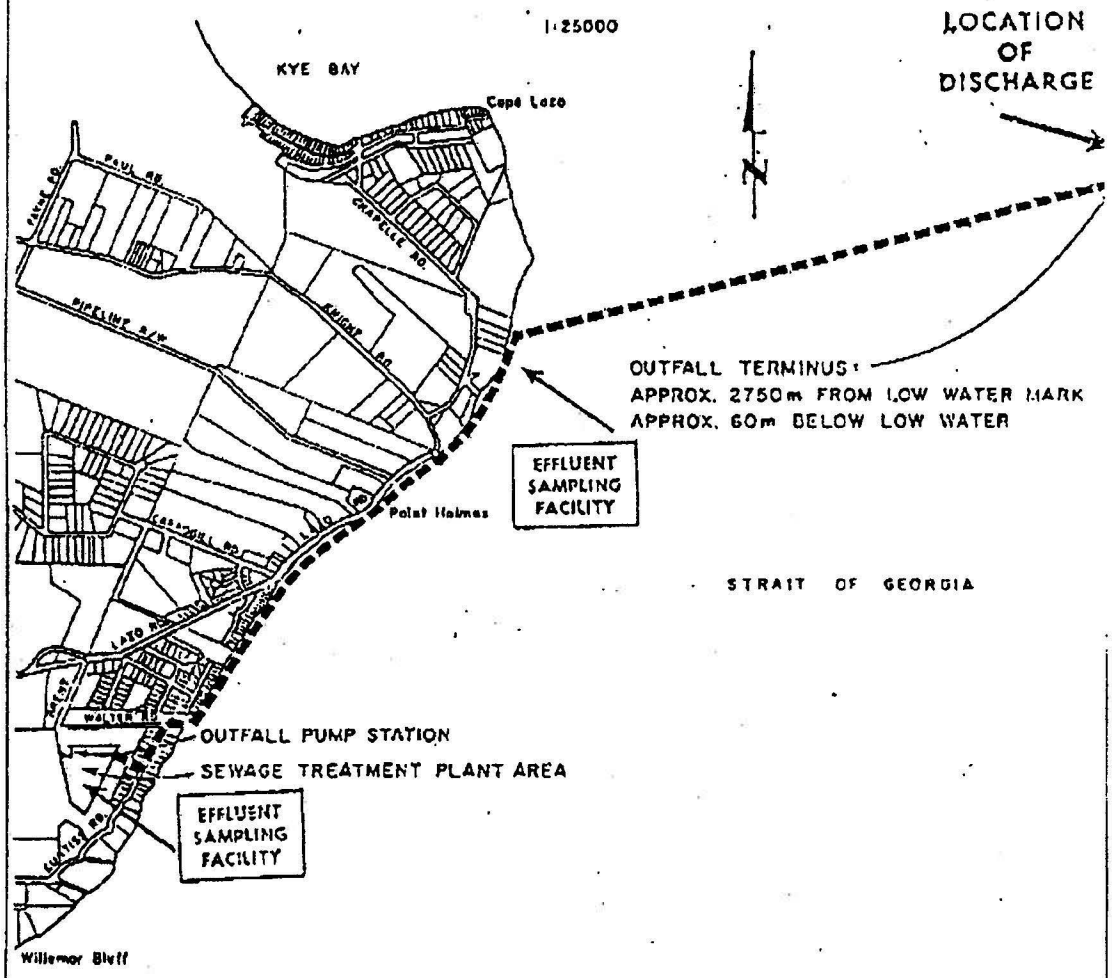
Province of British Columbia

Ministry of Environment

WASTE MANAGEMENT BRANCH

SITE PLAN

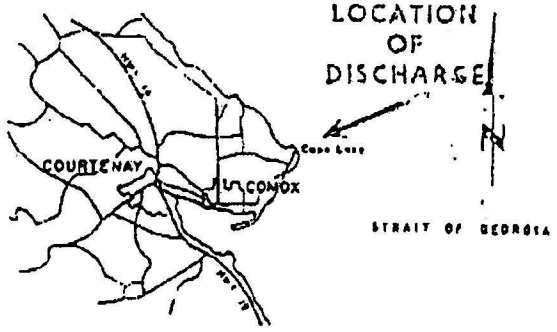
1:25000



ASSOCIATED ENGINEERING SERVICES LIMITED

DRAWING: V41E-21-001

LOCATION MAP



REG. DISTRICT OF COMOX-STRATHCONA

(Name of applicant(s))

(Date) (Signature of applicant(s) or agent)

(FOR OFFICIAL USE ONLY)

JUL 23 1985

Date Issued

L. E. Oldham

Regional Waste Manager

Date Amended

Appendix A-1 to Permit No. PE-5856

Approval No.

ENV 1987

Province of British Columbia
Ministry of Environment
Waste Management Branch
810 Blanshard Street
Victoria
British Columbia
V8V 1X5
Phone: 387-1161

YOUR FILE

OUR FILE. PE-5856

RECEIVED
BY LOOMIS
AUG 17 1982
REGIONAL DISTRICT OF
COMOX-STRATHCONA
FILE NO. SGP-S-2
SGP. 2-6

August 16, 1982

Regional District of Comox Strathcona
4795 Headquarters Road
Courtenay, B.C.
V9N 5N3

Attn: Mr. C.V. Flemming, P. Eng.
Director of Engineering

Gentlemen:

RE: Letter from D.A. Koers, Ph.D., P. Eng.
Dated August 4, 1982 to Mr. G.E. Oldham, P. Eng.
Regional Waste Manager, Nanaimo

Mr. Koers, of Associated Engineering Services Ltd., has requested a Letter of Approval supporting the concept of sludge composting as an alternative to conventional anaerobic sludge digestion.

Section (d), Appendix 01 of PE 5856 specifies in part "sludge digestion facilities". It is my considered opinion that an adequate sludge composting procedure is an acceptable method of sludge digestion and therefore qualifies as part of the "works authorized" under the existing permit.

You should note that once the composting facilities are designed, the details shall be submitted as an amendment to the plans with a request for plans approval.

Yours very truly,

H.P. Klassen
Assistant Director
Waste Management Branch

cc: AESL, Nanaimo
G.E. Oldham
P.N. Bardal
WMB, Campbell River

McElhanney

APPENDIX D

CVRD
SEWAGE MASTER PLAN
VILLAGE OF CUMBERLAND SEWAGE TREATMENT PLANT CAPACITY ASSESSMENT

DAYTON & KNIGHT REPORT

SEWAGE MASTER PLAN
VILLAGE OF CUMBERLAND SEWAGE TREATMENT PLANT CAPACITY ASSESSMENT

OCTOBER 2008

DAYTON & KNIGHT LTD.
Consulting Engineers

SEWAGE MASTER PLAN
VILLAGE OF CUMBERLAND
SEWAGE TREATMENT PLANT CAPACITY ASSESSMENT

TABLE OF CONTENTS

APPENDIX

LIST OF TABLES

TABLE OF CONTENTS (cont'd.)

LIST OF FIGURES

SEWAGE MASTER PLAN
VILLAGE OF CUMBERLAND
SEWAGE TREATMENT PLANT CAPACITY ASSESSMENT

1.0 INTRODUCTION

The Village of Cumberland Wastewater Treatment Plant is located on a 47.3 ha site located near Union Road. The site is a natural wetland area. Treatment is by a lagoon system, consisting of an aerated primary cell and a facultative secondary cell. The sewage collection is a combined system. Treated wastewater is discharged to Maple Lake Creek.

This review of the plant, as part of the Comox Valley Regional District (CVRD) Sewer Master Plan study contains a summary of the capacity of the existing plant and the current process loading.

The Village is currently engaged in a Liquid Waste Management Plan (LWMP) process, started in 1999. Flows and loads and treatment plant capacity presented in this memorandum is summarised from the LWMP Stage 3 Preliminary Engineering Report.

2.0 FLOWS AND LOADS

2.1 Population

The current service population of the Cumberland WWTP is 2,500 people.

2.2 Flows

The Cumberland sewage collection system is a combined system, collecting both wastewater and stormwater.

The monthly average flows presented in Table 2-1 and Figure 2-1 are based on an analysis of flow data recorded at the secondary lagoon discharge since 1992 (taken from the Village of Cumberland LWMP Stage 3 – Preliminary Engineering Report, McElhanney).

TABLE 2-1
AVERAGE MONTHLY FLOWS FROM THE CUMBERLAND WWTP

Month	Average Flow (m^3/d)
January	3,551
February	3,358
March	3,260
April	2,496
May	1,847
June	1,400
July	1,304
August	1,200
September	1,307
October	2,250
November	3,514
December	3,934

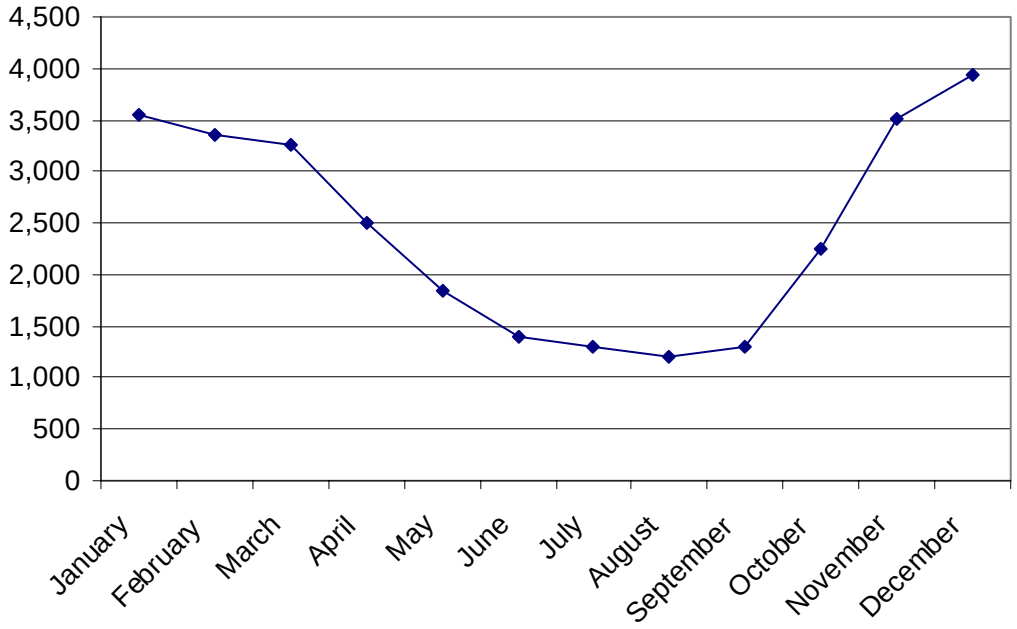


Figure 2-1 Average monthly flows from the Cumberland WWTP

2.3 Loads

Composite samples were taken during April 2005 to determine mass loading on the facility. Design mass loadings as given in the LWMP Stage 3 (McElhanney, 2006) are shown in Table 2-3.

TABLE 2-2
DESIGN LOADING ON THE CUMBERLAND WWTP

Parameter	Present Load (kg/day)
BOD_5	210
Soluble BOD_5	85
Total suspended solids	230
Total Nitrogen	30
Total Ammonia	12
TKN	28
Nitrate	2
Nitrite	0.5
Total phosphorus	4.5
Total dissolved phosphorus	2.5

3.0 DESCRIPTION OF FACILITIES

3.1 Influent Sewers

Wastewater enters the treatment plant through a 600 mm diameter gravity sewer, a 250 mm gravity sewer and also via a forcemain. A distribution manhole controls flow to the primary lagoon and allows bypass of the primary lagoon.

3.2 Primary Lagoon

The primary lagoon is unlined and has a volume of 12,020 m^3. The operating depth is 1.5 m. Due to sludge build-up, the working volume of the lagoon is estimated to be 7,400 m^3. Three surface aerators provide aeration. Sewage can overflow directly to Maple Lake Creek from the primary lagoon.

3.3 Secondary Lagoon

The secondary lagoon is a facultative cell. It is also unlined and has an operating depth of 1.5 m. The volume of the lagoon is 36,570 m^3. Due to sludge buildup, the working volume of the lagoon is estimated to be 30,500 m^3.

3.4 Effluent Flow Measurement

A v-notch flow measurement weir is located at the outlet of the secondary lagoon. However, there is doubt surrounding the accuracy of the readings.

4.0 TREATMENT REQUIREMENTS

4.1 Existing Permit PE-00197

The treatment plant discharge permit (PE-00197) is attached in Appendix A. The permit contains the following requirements:

- Annual average flow 910 m^3/d
- Maximum daily discharge 7,600 m^3/d
- Maximum BOD_5 30 mg/L
- Maximum TSS 30 mg/L
- Maximum Fecal Coliforms 200 MPN/100 mL
- Total Phosphorus 1.0 mg/L

4.2 Future Discharge Requirements

Maple Lake Creek has low, seasonally variable flows. Zero flow in summer periods has been observed. The minimum dilution requirements of the MSr are not met. The

discharge should therefore be considered stream augmentation, and must meet the MSR requirements for reclaimed water for unrestricted public access. Please see the Memorandum on evolution of wastewater regulations for further information regarding standards for reclaimed water.

An Environmental Assessment was conducted by Mimulus Biological Consultants in 2001 as part of the LWMP Stage 2. The discharge criteria in Table 4-1 were recommended for the discharge from the Cumberland WWTP.

TABLE 4-1
RECOMMENDED DISCHARGE CRITERIA (MIMULUS, 2001)

Parameter	Target Level
BOD_5	10 mg/L
TSS	10 mg/L
Fecal Coliforms	200 CFU/100 mL
Total Phosphorus	November to April: 1.0 mg/L May to October: 0.1 mg/L
Ortho-phosphate	November to April: 0.5 mg/L May to October: 0.05 mg/L
Nitrate	10 mg/L (maximum)
Nitrite	0.6 mg/L (maximum)

5.0 PERFORMANCE

The treatment plant discharge volume is higher than allowed under the permit. The annual average discharge is about 2,500 m^3/d, compared to the permitted annual average of 910 m^3/d.

Treatment plant effluent data from 1996 to 2000 was analyzed by Mimulus (2001). The concentrations of BOD_5 and TSS were generally within the permit requirements. Fecal coliforms were below the permitted maximum during the summer months, but well above the

maximum during the winter months. During the winter months, total phosphorus was below or very close to the permitted maximum; however, outside this period, the total phosphorus concentration was is significantly higher than permitted. When compared to the Mimulus recommended discharge criteria (Table 4-1), the concentration of BOD_5, TSS and fecal coliforms were generally below the recommended levels in summer months. Outside the summer months, the recommended levels were often exceeded. Total phosphorus and ortho-phosphate typically exceeded the recommended levels, particularly in summer. Nitrite in the effluent was found to be above the recommended level, while nitrate was below the recommended level.

According to the Stage 3 LWMP (McElhanney, 2006) the treatment capacity of the existing Cumberland WWTP is about 5,000 people (i.e., double the current service population). However, given that the plant does not appear to consistently produce an effluent that meets the discharge criteria recommended in the Environmental Assessment of Maple Lake Creek, significant improvements to the treatment facilities to enhance removal of BOD_5, TSS and fecal colifroms, and nutrients (nitrogen and phosphorus) will be required if the plant is to continue in operation for the long-term future. This will be further evaluated in Activity 3.

SEWAGE MASTER PLAN
VILLAGE OF CUMBERLAND
SEWAGE TREATMENT PLANT CAPACITY ASSESSMENT

APPENDIX A

DISCHARGE PERMIT PE-00197

BRITISH COLUMBIA

Sewer Lagoon Permit

Date: DEC 03 1997 File: PE-00197

REGISTERED MAIL

Village of Cumberland
PO Box 340
Cumberland BC V0R 1S0

Dear Permittee:

Enclosed is amended Permit PE-00197 issued under the provisions of the Waste Management Act. Your attention is respectfully directed to the terms and conditions outlined in the permit. An annual permit fee will be determined according to the Waste Management Permit Fees Regulation.

This permit does not authorise entry upon, crossing over, or use for any purpose of private or Crown lands or works, unless and except as authorised by the owner of such lands or works. The responsibility for obtaining such authority shall rest with the permittee. This permit is issued pursuant to the provisions of the Waste Management Act to ensure compliance with Section 54(3) of that statute, which makes it an offence to discharge waste without proper authorisation. It is also the responsibility of the permittee to ensure that all activities conducted under this authorisation are carried out with regard to the rights of third parties, and comply with other applicable legislation that may be in force.

This decision may be appealed to the Environmental Appeal Board. Notice of the appeal must (1) be in writing, (2) include the grounds for appeal, (3) be directed by registered mail or personally delivered to the Chair, Environmental Appeal Board, 4th Floor 836 Yates Street, Victoria B.C., V8V 1X4, (4) be delivered within 30 days from the date notice of the decision is given, and (5) be accompanied by a fee of $25, payable to the Minister of Finance and Corporate Relations. For further information, please contact the Environmental Appeal Board at (250) 387-3464.

Administration of this permit will be carried out by staff from our Regional office located at 2080-A Labieux Road, Nanaimo, British Columbia, V9T 6J9 (telephone 751-3100). Plans, data and reports pertinent to the permit are to be submitted to the Regional Waste Manager, at this address.

Yours truly,

J. O. Finnie, P. Eng.
Assistant Regional Waste Manager
Vancouver Island Regionn

Enclosure

Ministry of Environment Lands and Parks
Environment and Lands Vancouver Island Region
2080-A Labieux Road
Nanaimo, British Columbia
V9T 6J9
Telephone: (250) 751-3100
Fax: (250) 751-3103

Nov. 28, 1997 BMS

BRITISH COLUMBIA

MINISTRY OF ENVIRONMENT,
LANDS AND PARKS

Vancouver Island Region
Pollution Prevention
2080-A Labieux Road
Nanaimo, British Columbia
V9T 6J9
Telephone: (250) 751-3100
Fax: (250) 751-3103

PERMIT

PE-00197

Under the Provisions of the Waste Management Act

Village of Cumberland

PO Box 340

Cumberland, British Columbia

V0R 1S0

is authorised to discharge effluent to Maple Lake Creek which is a tributary to the Trent River from a municipal wastewater treatment system located in the Village of Cumberland, British Columbia, subject to the conditions listed below. Contravention of any of these conditions is a violation of the Waste Management Act and may result in prosecution.

1. AUTHORISED DISCHARGES

1.1 This subsection applies to the discharge of effluent from a **MUNICIPAL COLLECTION AND TREATMENT SYSTEM SERVING THE VILLAGE OF CUMBERLAND**. The site reference number for this discharge is E100753.

1.1.1 The authorized rate of discharge based on an annual averaging period is 910 m^3/d.

1.1.2 The maximum authorized rate of discharge of domestic sewage and stormwater is 7,600 m^3/d.

After September 1, 2015, the authorized maximum rate of discharge of domestic sewage and stormwater is 2710 m^3/d.

J.O. Finnie, P.Eng.
Assistant Regional Waste Manager

Date Issued: August 25, 1967
Date Amended:
(most recent) DEC 03 1997
Page: 1 of 7

Nov 28, 1997 MO

1.1.3 The characteristics of the discharge shall not exceed:

5-Day Biochemical Oxygen Demand - 30 mg/L
Total Suspended Solids - 60 mg/L

After May 1, 1999, the characteristics of the discharge shall not exceed:

5-Day Biochemical Oxygen Demand - 30 mg/L
Total Suspended Solids - 30 mg/L
Faecal Coliform bacteria - 200 MPN/100 ml (Maximum)
Total Phosphorus - 1.0 mg/L

1.1.4 The authorised works are mechanical screens, an aerated lagoon, a stabilization pond, and related appurtenances approximately located as shown on attached Site Plan A.

After May 1, 1999, the authorized works are to include disinfection and nutrient removal facilities or alternate disposal methods.

1.1.5 The authorised works must be complete and in operation on and from the date of this amended permit or as otherwise indicated in Subsection 1.1.4.

1.1.6 The location of the facilities from which the discharge originates is Lot A, Plan 23092, District Lot 24, Nelson Land District..

1.1.7 The location of the point of discharge is Maple Lake Creek..

2. GENERAL REQUIREMENTS

2.1 Maintenance of Works and Emergency Procedures

The permittee shall inspect the authorised works regularly and maintain them in good working order. In the event of an emergency or condition beyond the control of the permittee which prevents effective operation of the approved method of pollution control, the permittee shall notify the Regional Waste Manager immediately and take appropriate remedial action.

2.2 Bypasses

The permittee shall ensure that no waste is discharged without being processed through the authorised works unless prior written approval is received from the Regional Waste Manager.

J.O. Finnie, P.Eng.
Assistant Regional Waste Manager

2.3 Process Modifications

The permittee shall have prior written approval from the Regional Waste Manager, prior to implementing changes to the authorised works or to any process that may affect the quality and/or quantity of the discharge.

2.4 Plans - New Works

Plans and specifications of the disinfection facilities and the nutrient reduction facilities authorised in Subsection 1.1.4 shall be certified by a qualified professional licensed to practice in the Province of British Columbia, and submitted to the Regional Waste Manager for review before construction commences. A qualified professional licensed to practice in the Province of British Columbia must certify that the works have been constructed in accordance with the submitted plans.

2.5 Posting Requirements

The permittee shall erect signs along the alignment of Maple Lake Creek at all recognized access points to the Creek and at all road crossings and at the confluence with the Trent River. The signs shall identify the Creek as containing treated sewage effluent and should warn the public that the water is not safe for drinking purposes or personal contact. The wording , size and locations of signs requires the approval of the Regional Waste Manager. The signs must be erected on or before March 31, 1998.

2.6 Standby Power

The Permittee shall provide auxiliary power facilities to insure the continuous operation of the sewage treatment plant.

2.7 Sludge Wasting and Screenings Disposal

Sludge and screenings from the treatment plant shall be disposed of in a manner authorised by the Regional Waste Manager.

2.8 Effluent Upgrading

Based on receiving environment monitoring data and/or other information obtained in connection with this discharge, the permittee may be required to provide additional treatment facilities.

2.9 Disinfection

Disinfection of the effluent is required by May 1, 1999. If disinfection is by chlorination, dechlorination facilities will also be required.

J.O. Finnie, P.Eng.
Assistant Regional Waste Manager

Nov. 28, 1997.

2.10 Odour

Should objectionable odours, attributable to the operation of the sewage treatment plant occur beyond the property boundary, or attributable to the effluent in Maple Lake Creek or the Trent River, as determined by the Regional Waste Manager, measures or additional works will be required to reduce the odour to acceptable levels.

2.11 Foam

Should objectionable amounts of foam, attributable to the effluent, occur on the receiving waters, measures will be required to either eliminate the cause of the foam or to eliminate the foam by additional treatment.

2.12 Facility Classification and Operator Certification

The permittee shall have the works authorised by this permit classified (and the classification shall be maintained) by the Environmental Operators Certification Program Society (Society). The works shall be operated and maintained by persons certified within and according to the program provided by the Society. Certification must be completed to the satisfaction of the Regional Waste Manager. In addition, the Regional Waste Manager shall be notified of the classification level of the facility and certification level of the operators, and changes of operators and/or operator certification levels within 30 days of any change.

Alternatively, the works authorised by this permit shall be operated and maintained by persons who the permittee can demonstrate to the satisfaction of the Regional Waste Manager, are qualified in the safe and proper operation of the facility for the protection of the environment.

2.13 Land Requirements

The Permittee shall secure and hold in reserve sufficient land to allow for future expansion and upgrading of the sewage treatment facilities.

2.14 Liquid Waste Management Planning

The Regional District of Comox-Strathcona is developing a Liquid Waste Management Plan that may include the Cumberland area. Notwithstanding the terms and conditions of this permit, the authorized discharge is subject to the provisions of the Liquid Waste Management Plan once approved by the Minister.

J.O. Finnie, P.Eng.
Assistant Regional Waste Manager

Nov. 28, 1997 - Amd

If the regional district plan does not incorporate the Cumberland area or if the plan is not progressing satisfactorily, as determined by the Regional Waste Manager, then the Permittee shall undertake the following activities:

Source Control Program
Stormwater Management Plan
Sludge Wasting and Screening Disposal and Biosolids Management Plan
Inflow and Infiltration Control Program
Sanitary and Storm Sewer Separation Plan

Terms of reference, development schedules and implementation timetables for the above activities shall be submitted to the Regional Waste Manager by December 31, 1999 for approval and shall be implemented as directed by the Regional Waste Manager.

3. MONITORING AND REPORTING REQUIREMENTS

3.1 Discharge Monitoring

3.1.1 Flow Measurement

Provide and maintain a suitable flow measuring device and record once per day the effluent volume discharged over a 24-hour period.

3.1.2 Sampling And Analyses

The permittee shall install a suitable sampling facility and obtain a grab sample of the effluent once every month.

Obtain analyses of the sample for the following:

5 - Day Biochemical Oxygen Demand
Total Suspended Solids
Faecal Coliform
Total Phosphorus
Ammonia Nitrogen

J.O. Finnie, P.Eng.
Assistant Regional Waste Manager

Nov. 28, 1997

In addition, the permittee shall obtain a grab sample of the effluent once per year and obtain analysis of the sample for the following:

Aluminium (total);	Manganese (dissolved);
Arsenic (total);	Methlene Blue Active Substances;
Barium (dissolved);	Mercury (total);
Boron (dissolved);	Molybdenum (total);
Chromium (total);	Nickel (total);
Cadmium (dissolved);	Oil and Grease;
Copper (total and dissolved);	Selenium (Total);
Cobalt (dissolved);	Silver (total);
Cyanide (total);	Sulphate (dissolved);
Iron (dissolved);	Sulphide (dissolved);
Lead (total);	Tin (total); and
Toxicity (LC_{50})	Zinc (total)

3.2 Receiving Environment Monitoring

Beginning January 1, 1998 the Permittee shall conduct a receiving environment monitoring program that will consist of monitoring of Maple Lake Creek and Trent River at the following locations.

Location	Seam Site
Maple Lake Creek, 100m upstream from confluence	0140124
Trent River, 100 m upstream from confluence	0127581
Trent River, 100m downstream from confluence	0127582
Trent River, 400 m downstream from confluence	E227350

Water samples will be collected in the months of March, May, July, September, and November and analyzed for pH, temperature, dissolved oxygen, specific conductance, faecal coliform, ammonia nitrogen, nitrite and nitrate nitrogen, total phosphorus and ortho-phosphate.

During the months of May, July and September each year, the Permittee will also undertake a monitoring program for chlorophyll a on the Trent River at three locations (100 m upstream from, and 100 m and 400 m downstream from the confluence with Maple Lake Creek)

Based on the results of this monitoring program, the permittee monitoring requirements may be extended or altered by the Regional Waste Manager

J.O. Finnie, P.Eng.
Assistant Regional Waste Manager

3.3 Sampling and Analytical Procedures

Flow Measurement shall be carried out in accordance with the procedures described in "Field Criteria for Sampling Effluents and Receiving Waters", April 1989, or by suitable alternative procedures as authorised by the Regional Waste Manager.

Copies of the above manual are may be purchased from the Pollution Prevention Division, Ministry of Environment, Lands and Parks, PO Box 9342, Stn. Prov. Govt. Victoria, British Columbia, V8W 9M1. The manual is also available for review at all Pollution Prevention Offices.

Sampling shall be carried out in accordance with the procedures described in the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples. 1996 Edition (Permittee)", or by suitable alternative procedures as authorised by the Regional Waste Manager.

Analyses are to be carried out in accordance with procedures described in the "British Columbia Environmental Laboratory Manual for the Analysis of Water, Wastewater, Sediment and Biological Materials (March 1994 Permittee Edition)", or by suitable alternative procedures as authorised by the Regional Waste Manager.

Copies of the above manuals may be purchased from the Queen's Printer Publications Centre, P. O. Box 9452, Stn. Prov. Gov't. Victoria, British Columbia, V8W 9V7 (1-800-663-6105 or (250) 387-6409), and are also available for inspection at all Pollution Prevention offices.

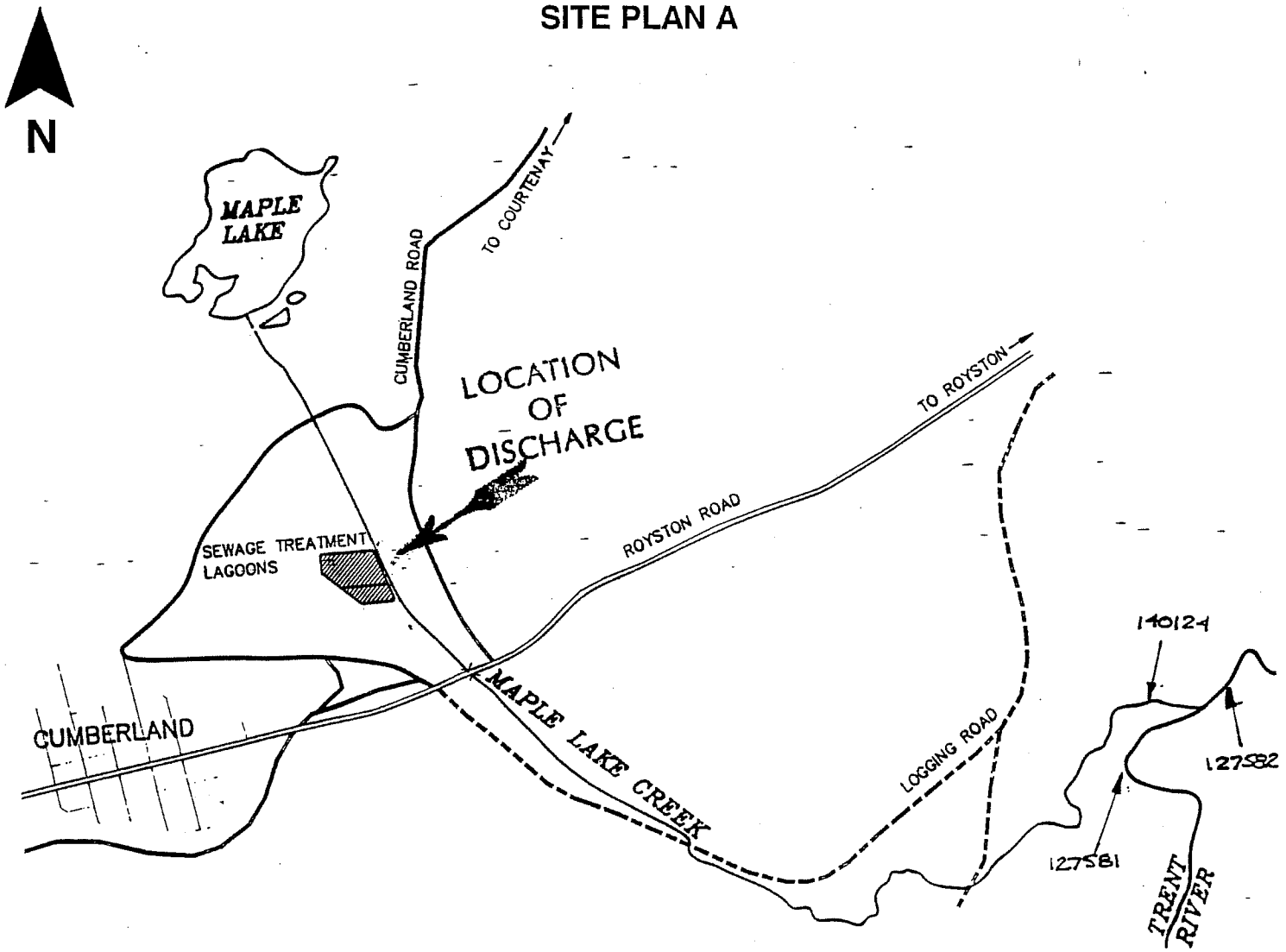
3.4 Reporting

Maintain data of analyses and flow measurements for inspection and every three months submit the data, suitably tabulated, to the Regional Waste Manager for the previous week. The first report is to be submitted by March 31, 1998. Based on the results of the monitoring program, the permittee monitoring requirements may be extended or altered by the Regional Waste Manager.

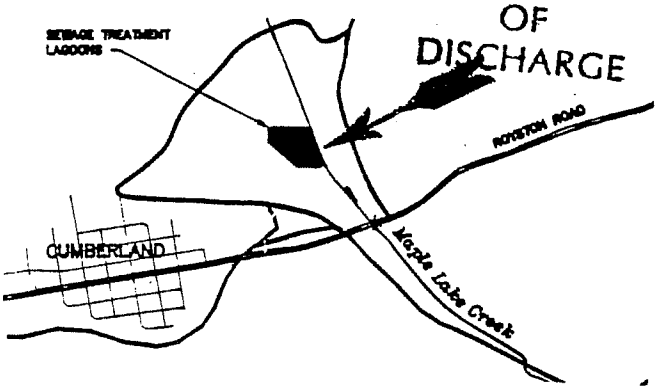
J.O. Finnie, P.Eng.
Assistant Regional Waste Manager

Nov 28, 1997 DM

SITE PLAN A



Location Map



Scale: Not to Scale

Permit: PE-00197

Date: DEC 03 1997

J. O. Finnie
Assistant Regional Waste Manager
Vancouver Island Region

Nov. 28. 1997-A